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Address.

THE DANGERS OF ETHER AS AN ANESTHETIC.*

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It is a great pleasure to tender my thanks to the Trustees and the Committee for their kind invitation to deliver an Ether Day Address.

In this historic place, 69 years ago this very day, occurred the first public use of ether as an anesthetic. We, who are accustomed to anesthesia, can hardly appreciate the courage of Warren and Morton on that memorable sixteenth of October, 1846. Surely also the bravery of the patient himself should not be overlooked. The name of Gilbert Abbott should always be held in remembrance.

I have often called the attention of my classes to a patient lying limp and apparently almost lifeless on the operating table. Lift the arm and it falls as if it were that of a corpse, touch the sensitive eye and the lids do not move. Cut the tender skin and it elicits no response. "Will he ever wake up?" "May not the flickering flame of life gradually fade away and forever?" "Have I not unwittingly killed this man?" Such must have been the insistent questions in

* Address delivered at the Massachusetts General Hospital, on the sixty-ninth anniversary of Ether Day, October 16, 1915.

the minds of those intrepid adventurers on that momentous occasion. How eagerly must they have welcomed the first faint evidences of returning consciousness! Had that young man died then and there, for how many years would the blessings of anesthesia have been withholden from the human race! Only eleven years earlier (1835) Pêre Velpeau, the great French surgeon, had said, "Eviter la douleur dans les opérations est un chimère qu'il n'est pas permis de poursuivre aujourd'hui." Who would have dared to repeat the dangerous experiment? For an experiment and a most hazardous experiment on a human being, it certainly was. Happily the result justified their temerity and millions have been blessed by the bravery of the surgeon, the anesthetist, and the patient.

In Berlin where I was a student in 1865-6 the story ran—and I believe it was authentic—that a short time earlier Henry B. Sands of New York, urging the greater safety of ether upon Langenbeck, at his request, gave ether for him in his clinic. The patient died on the table from the anesthetic. Naturally this deferred the use of ether in Germany for years and cost many lives.

In this city and this hospital my topic—The Dangers of Ether as an Anesthetic—may at the first blush seem ungracious. But our profession ever seeks the unvarnished and untarnished truth. To recognize that there are dangers is the first step in eliminating them. When life is at stake ignorance is not bliss. Forewarned is forearmed.

When I accepted the invitation and selected my topic, which had not been considered in any of the former Ether Day Addresses, I thought I had chosen an easy task. But I had hardly begun my work when I found that great progress had been made, as to much of which I was inadequately informed.

While I have had a large experience during a long and active surgical life, yet, in consequence of my retirement from active practice in 1907, I have had little or no personal experience with a number of the newest anesthetics and the latest modes of their administration. Accordingly, to make up for this lack, I devoted the past summer to the diligent study of the recent work on anesthetics and anesthesia by reading the extensive literature (especially the valuable physiological literature) of the last ten years, to a considerable correspondence, as the friends whom I persecuted will testify, and in the early autumn to some careful observations of the administration of anesthetics in Boston, New York, and Philadelphia. It has had all the fascination of novelty and the exhilaration of success.

When I began my medical studies in 1860 there were but two anesthetics in use, ether and chloroform. Now the many anesthetic drugs, the different methods of using them, by inhalation, by insufflation, by arterial or venous infusion, by different routes,—the mouth, the nose, the rectum, the colon—by local anesthesia, by spinal anesthesia, by one drug alone or by two or more, together, or in varying sequences, by simple or complicated apparatuses, or costly and elaborate chambers for differential pressure, have almost reached the classical "57 varieties."

During the last 10 years especially, the administration of anesthetics has been rapidly changing. It is becoming more and more an exact science instead of a mass of only empirical knowledge gained by practice and at the cost of danger or sometimes even of life. The multiplicity of valuable papers, the many set discussions in our medical societies, the exhaustive studies in our laboratories of research on the physics, the physiology and the chemistry of respiration and of anesthetics, the pathological changes observed in animals after intentional or accidental deaths, and after similar accidental deaths in human beings, the accumulated large statistics all demonstrate the deep interest, the scientific activity and the happy results of this new outburst of work in anesthesia.

One of the happiest results of this restless search for improvement is the rise of the *professional anesthetist*, an expert who by his mastery of the subject and his knowledge and presence of danger, is able to avert or to remedy the danger—an expert who is more and more definitely coming to be recognized as comparable to the expert specialist in other departments of medicine and surgery. Says Bloodgood,¹ "Accumulated experience and reading

... impress me more and more that anesthesia is an art in every sense of the word. *Specially trained anesthetists are necessary for safety.*"

The recent organization of the American Association of Anesthetists is another welcome evidence of progress. That professional specialists in anesthesia are greatly needed is strikingly shown by the frank reply to my questionnaire by the chief anesthetist of one of our best American hospitals. "To what do you attribute the deaths from ether?" was my question, and his reply began "Lack of skill in its administration."

That such experts are specially needed in America is shown by the fact that Gwathmey's American statistics² compared with those of Hewitt in England show that in this country our percentage of mortality from ether is over three times as great as in Great Britain.

Lest the general public who may read this may take alarm and exaggerate the dangers of ether, let me say at once that the deaths are estimated in various statistics as being only one death in 4533 administrations in America (Gwathmey), one in 5112 in Germany,³ one in 16,302 in Great Britain,⁴ and even only one in 50,000 (Rovsing).⁵ But even if it be only one in 50,000 yet if that one is *your* boy, it is a sorry consolation to know that 49,999 others escaped.

As soon as I fixed upon my topic I sent out to the members of the American Surgical Association a questionnaire as to immediate and delayed ether deaths, requesting exact figures if they were available, and estimated figures if they were not. I received 67 replies, for which I tender my sincere thanks to my correspondents, a number of whom took much pains in compiling their statistics.

In 20 replies the figures were exact, though those of several active surgeons covered only a very few years. These returns showed,

Exact number of etherizations	 262,002
Number of deaths	 34
Or 1 death in	7,706 cases.

This is an improvement over Gwathmey's statistics, but the 34 deaths do not include some delayed deaths from pneumonia, nephritis, etc., which would probably bring the proportion down to about Gwathmey's figures or possibly worse. The 47 others—including, I regret to say, myself—could only estimate the number of their cases and deaths. The approximation to former statistics is gratifying as showing that the estimates were reasonably accurate and not too seriously optimistic.

Estimated number of etherizations	356,500
Estimated number of deaths	 73
Or 1 death in	4,884 cases.

Both the estimated and the exact numbers show that we have still over three times the relative number of deaths as in Great Britain—a

¹ Anesthetics, p. 855.

² Gurli, Arch. klin. Chir., 1897, iv, 473.

³ Hewitt and Robinson, Anesthetics, London, 1912, p. 139.

⁴ Abdominal Surgery, Edited by Ficker, p. 76 See footnote page 840.

⁵ Prog. Med., December, 1905, p. 173.

serious blot on our methods and results. This calls loudly for reform. The systematic use of duplicate charts, if collected from all available sources at intervals of five years, would show whether our results were improving or growing worse.

Compared with chloroform the dangers of ether are almost negligible. In Great Britain from 1910 to 1913 there were 700 inquests on deaths from anesthetics.* Of these, chloroform and its mixtures were responsible for 478 and ether for only 28. What is the relative percentage of fatalities of each, however, we do not know.

Personally I was brought up by the elder Gross in the Chloroform School, and I generally used it in my earlier cases. But I was soon convinced of my error, and for the last forty years I have used chloroform very, very rarely. I regard it either alone or in mixtures as a most dangerous anesthetic. With Bevan† and the Committee on Anesthesia of the American Medical Association,‡ I would urge that it should be discarded, excepting in a few special cases, also in the tropics and in military surgery on or near the battlefield, and on naval vessels during action.§ In base hospitals and on hospital ships ether should be used.*

What we want is such an anesthetic and such anesthetists that there shall be *no deaths at all*. The search for this ideal anesthetic must be vigorously continued by experiment first upon animals. It has not yet been found, for every anesthetic known has its own dangers. I fear that even the best future anesthetic may not be wholly free from this possibility. As I have more than once pointed out, the ideal anesthetic should not preserve the consciousness of the patient, who would easily be terribly frightened at the least suspicion of danger, dangers which the surgeon has often encountered and easily vanquished. They would not only alarm the patient, but would often provoke uncontrollable physical movements which would cause serious dangers or entirely prevent the operation. This ideal anesthetic must also, if possible, be pleasant to administer, efficacious in abolishing all pain, free from noxious after-effects, and, if possible, without danger to life.

Our commonest anesthetic—ether—is to me, personally, both as surgeon and as patient, so little repulsive, and has such very slight danger in competent hands, that after having used it thousands of times with patients, and taken it myself on six different occasions, so far as any feeling of apprehension or repugnance is concerned, I would as lief lie down on the table and take ether as I would sit down at my table and eat my breakfast. No

* The papers and discussions on Anesthesia in the American Surgical Association in 1911 and 1915 will well repay perusal by every surgeon and every anesthetist.

† Editorial, Jour. Amer. Med. Assn., April 4, 1914, p. 1098.

‡ Trans. Amer. Surg. Assn., 1915, and Journal American Medical Association, October 23, 1915, p. 1418.

§ Jour. Amer. Med. Assn., June 11, 1916, p. 1907.

* McCullough, Jour. Amer. Med. Assn., Sept. 25, 1915, p. 1090.

one, however, except by *force majeure* shall ever again give it to me as on the first occasion, in 1863, from a closed cone saturated with ether, which almost suffocated me. By the open drop on a mask or the Allis inhaler,* which are practically equivalent, I have five other times been most pleasantly and efficaciously anesthetized. Not once have I had the least nausea. The long-continued ether taste and once some gas pains were the only unpleasant aftermaths. *Haud ineptus loquor*.

"If patients could be educated to be as pleased when they are told that a surgical operation is necessary as they are when given a tonic, Utopia would be reached," says Bloodgood.

I reached such a Utopia some years ago when a young girl burst into tears upon my telling her that an operation for appendicitis was necessary. I tried to comfort her, but to my surprise she replied between her sobs that she was weeping for joy, for she had feared I would decide *not* to operate. Such Utopias, however, are not yet common, but I have found them gradually growing more frequent as the public are more and more convinced of the safety of modern operations and the danger of delay.

The students in our medical schools see a great many anesthetized patients, but their attention is given chiefly to the operation. Too often they receive little and in some schools no careful instruction in anesthesia. Far too frequently the function of the etherizer is delegated to the ever-changing junior residents, as if, forsooth, it were of minor importance. Next to the surgeon and even before his first operative assistant, in my opinion, stands the anesthetist, holding the scales of Life and Death. Happily, at least in the use of ether, the margin of safety is so wide that even inexperience and inattention are rarely harmful.

It should be the duty of our medical schools and their hospitals to *instruct all students in anesthesia and to give them experience* by having them administer anesthetics under the supervision of their experts. In view of the constant and necessary change of internes there should be on the staff of each division a permanent expert. In small hospitals at least one of the staff should make it his business to become an expert by constant study and practice.

The anesthetist should if possible always see the patient beforehand. He can thus establish an "*entente cordiale*" which will do much to prevent fear and other psychic elements of danger.

Gerster says that long ago he learned in Billroth's clinic to be careful with patients who exhibited fear but that he never understood the reasons until Crile and Yandell Henderson explained them.

The most striking instance of the *physical results of fear* I have ever known personally was a

* The ether should be dropped on the Allis inhaler just as on a mask, slowly at first, faster and faster in a few minutes, but never poured in. Moderate rebreathing can be obtained by covering the upper surface by the hand.

little girl of nine in my ward at the Jefferson Hospital. Her clothing had caught fire and she had been so dreadfully burned that a year after the accident I was compelled to amputate the left arm at the shoulder joint. She made an excellent recovery *per primam*, but had not been discharged because an old ulcer on the deltoid flap had not yet quite healed. Four weeks after the amputation she was suddenly awakened in the middle of the night by a nearby fire. The ward was high studded, the windows many. It was no wonder, therefore, that remembering her own dreadful experience and seeing the flames and the brightly illuminated ward, she should think the ward itself afire and become terrified. A thoughtful nurse took her temperature, which had long been normal, and found it 105.4°. The next morning it was 99°.

A similar but less striking instance is recorded by Crile and Lower¹⁰ in which simple fear raised the temperature to 101.2° and the pulse to 150. Bloodgood¹¹ reports a case in which fear alone caused the blood pressure to fall in ten minutes from 140 to 80 m.m. In some cases even death has resulted from fear before an anesthetic has been given.

Crile is none too insistent upon the psychic as well as the physical conditions, which are so conducive to smooth recovery.

The condition of the blood should be ascertained beforehand in all serious operations, especially in anemic patients. DaCosta¹² and DaCosta and Kalteyer¹³ and others have demonstrated the diminution of hemoglobin due to ether. While Mikulicz advised against any general anesthetic in case the hemoglobin was below 30%, DaCosta and Kalteyer represent a better present opinion by drawing the line at 50%.

Observation and charting of the blood pressure not only beforehand, but at frequent and regular intervals during every important or prolonged operation, especially as a guide to the degree of shock, is admitted to be important by all anesthetists.

The anesthetist should give quick warning of any serious fall in the blood pressure, which will enable the surgeon to decide for or against transfusion, for or against attempted extirpation of a brain tumor, for continuing or quickly terminating an operation. This decision can thus be made with scientific accuracy far more surely than by observation of the general physical appearance of the patient. Accurately known blood pressure is of greater value than the rate or quality of the pulse, and as pointed out by Harmer, gives warning from 5 to 20 minutes earlier than the pulse. Moreover, in the doubtful cases it is the most useful.

Prior to operations the anesthetist as well as surgeon should make himself familiar with the condition of the heart, kidneys, blood pressure, hemoglobin, and any unusual condition; should

see that the mouth, tongue, teeth and tonsils are in proper condition and that provision be made to prevent chilling of the patient,—an important point never to be overlooked. Chilling and hemorrhage are the most potent factors in producing shock. Chilling by cold solutions and by alcohol used in pre-operative preparations do harm, as demonstrated by Harmer.

The anesthetist should provide against certain dangers common to all anesthetics, such as false teeth and other foreign bodies in the mouth, the prevention of paralysis of the musculospiral and other nerves from pressure or from abnormal positions of the arm or leg. I have had one non-fatal case of hemiplegia occurring a few hours after etherization. It is possible but not certain that this was a direct result of the increased blood pressure. Several other similar and sometimes fatal cases have been reported. It is to be remembered that in a few cases a hemiplegia has occurred shortly before the time set for operation. Had the hemiplegia occurred only a few hours or days later it might have occurred during the operation and have been (erroneously) attributed to the ether.

During operation the anesthetist should attend strictly to his own business and especially remember that the first half hour is the period of greatest danger. He should glance at the operation only from time to time, not to study the operation, but in order to anticipate the need for lighter or deeper anesthesia and when the anesthetic may be stopped. Of course he should keep himself constantly informed of the general condition of the patient by observation of the respiration, the most important function of all, of the blood pressure, pulse, pupil, color, and condition of the skin as to sweating.

I believe that an *anesthesia chart* should be kept in every case—even for a brief etherization. How elaborate this should be is a debatable question. The American Surgical Association could do good service, as Lilienthal has suggested in a letter to me, if through a committee it should prepare a standard chart adapted to most hospitals and most anesthetists. I am persuaded that a chart tends to concentrate the attention of the anesthetist upon his "job" and make him more careful. In a few years such charts would also furnish us with very valuable and extensive statistics. The form should be full enough to make it valuable and to compel the average anesthetist to make close and continuous observation, yet not so elaborate and detailed as to defeat its own object. Some especially expert anesthetists would prefer a more elaborate chart for more detailed observations. The American Surgical Association might also prepare this fuller form and each anesthetist could make his choice.

On first seeing the charts used by Boothby¹⁴ I was staggered by their apparent complexity. When analyzed, however, I found there was less than one observation per minute. In prac-

¹⁰ Anesth.-Association, p. 97.

¹¹ Prog. Med., December, 1912, p. 218.

¹² Med. News, March 5, 1895, p. 125.

¹³ Annals of Surgery, 1901, Vol. xxxiv, p. 329.

¹⁴ Jour. Pharmacol. and Exp. Therap., March, 1914, p. 329.

tice, as I have observed, Boothby easily records them all himself in a quiet leisurely fashion. Instead of distracting attention from the patient, these records fix the anesthetist's attention much more closely upon the patient's condition than if no chart is used. The occasional anesthetist will hardly be able to utilize any but the simplest chart.

If it be objected that a chart, and especially a full one, is a great deal of trouble, I answer: "Giving ether is a serious business, always attended by possibility of danger. Life may depend on the carefulness of the anesthetist, and this is surely worth any amount of trouble."

One feature of the chart of the Massachusetts General Hospital is exceedingly valuable, viz.:—that there is a first or pre-operative part to be filled in by the house officer (surgical or medical), who has had charge of the patient, giving most of the data the anesthetist should know beforehand; a second part relating to the data and conditions during operation to be filled in by the anesthetist; and a third post-operative part to be filled in by the nurse in charge of the case immediately after operation. A duplicate carbon copy should be made, the original to be filed with the notes of the case; the copy with the consolidated "Anesthesia Records."

Here the question arises whether a doctor or a woman nurse is in general the more desirable anesthetist. No hard and fast rule can be laid down. Surely no legislative action is called for, though it has been actually proposed. If one has an Alice Magaw (Kessel) or a Florence Henderson of the Mayo Clinic* or a Sister Ethelrida of Murphy's Clinic the decision is easily in favor of the trained nurse. If, however, one has such skilled doctors as we find especially here in Boston and other of our large cities the decision is reversed.

The nurse lives in the hospital and can see the patient at all times. She can soothe the timid patient, who is more often of her own sex, better than most men. She is more vigilant in observing small details. She will be less likely to be lured away from the rôle of the professional anesthetist than a man, who too often uses anesthesia merely as a stepping-stone to private surgical practice. A doctor, however, because he has studied medicine, is more thoroughly equipped than a nurse (until her experience runs into hundreds of cases) to appreciate possible or even impending dangers. Moreover, the doctor is less apt to be upset and "flustered" by a sudden perilous emergency. The best solution of all perhaps is an intelligent and alert woman doctor, such as Dr. Isabella C. Herb in Bevan's Clinic. Such Herbs, however, do not grow in every surgical garden.

Personality, intelligence, zeal and quick wit may easily be worth more than greater knowledge.

* For two admirable and practical papers see Alice Magaw, *Surg., Gynecol. and Obst.*, 1906, Vol. III, p. 789, and *Collected Papers, Mayo Clinic*, 1905-06, p. 567; and Florence Henderson, *St. Paul Med. Jour.*, February, 1914, p. 74, and *Collected Papers, Mayo Clinic*, 1913, p. 701.

In order that medical men and women shall devote themselves to anesthesia as a specialty, the public must be taught that safety lies in having an expert anesthetist, and that like any other expert, if he is to obtain a living as such, he must be well paid, otherwise he cannot devote his whole time to this specialty.

I might add also that the profession itself does not yet sufficiently appreciate this same point. Roberts¹³ cordially endorses this view. The peril he so valiantly attacked is gradually passing away.

One of the real but infrequent dangers of ether is its *inflammability*. I should probably omit this because of its infrequency had I not had personally what might have been a very serious accident.

Nearly everybody thinks that the vapor from a *volatile* substance of course rises upwards. The etherizer must never forget that the vapor of ether is *heavier* than air and falls downwards. Saturate a bit of gauze with ether. Hold the back of the hand first *above* the gauze and then *below* it and you will never forget that ether vapor falls. In 1863, after Gettysburg, in a large military hospital of 3000 beds in pavilions built wholly of wood, I was trying to secure a large bleeding vessel just above the inner end of the clavicle. The only available light was five candles stuck in five augur holes in a square block of wood and held necessarily very near the ether cone. Suddenly the ether flashed afire, the etherizer flung the glass bottle of ether (it was before the days of our present tin cans) in one direction and the blazing cone fortunately in another. We narrowly escaped a serious conflagration. Why did I not use chloroform, which is non-inflammable, in conditions well known before I began to operate? I fear I must admit gross thoughtlessness. My only consolation is that the patient suffered no harm. Neither he nor I was burned and he recovered without further incident.

So happy an outcome does not always occur, for there are on record a number of cases of more or less serious burns of both patient and surgeon. In one case, when the switch of an electric hand light was turned on to observe the color of the face (the patient being prone) the spark ignited the ether.

"Inflammability of the patient" might also be mentioned as a possible danger to the *surgeon*. Here again I speak from two personal experiences. In one, the patient in his early frenzy, disengaged himself suddenly from the etherizer, scattered the assistants and was about to assault me, when fortunately, a strong Irish orderly who, again fortunately, was standing behind him, so that the dazed patient was not aware of his presence, seized him around the waist and held him till the stage of excitement quickly passed away. Though bound like Samson with many withes, four strong men and the etherizer a few minutes later scarcely prevented his redue-

¹³ *The Anesthesia Peril*, *Therap. Gaz.*, Feb. 15, 1908.

ing the table to firewood in a second attempt to "get" me.

The other case I relate especially as a warning that no one should ever give ether without the presence of another person, except in emergencies when such help cannot possibly be obtained.

Many years ago I had to open an abscess in a young man. The etherizer did not appear, and as the patient was suffering I unwisely gave him the ether alone. He had taken only a few inhalations when he was seized with the delusion that I was about to do him harm. With one sweep he threw the ether cone away, leaped up, seized a chair and swinging it high above his head was ready, nay determined, to brain me. As he was an athletic six-footer, and as he stood between myself and the door, fight and flight were equally impossible. I lost no time, you may be sure, in entering what I believe the lawyers call a plea of "confession and avoidance"; a confession of my folly, and a lively avoidance of my enemy. I have always accepted the axiom that two bodies cannot occupy the same space at the same time, but ever since that "episode," as Artemus Ward would have called it, I have been equally convinced that one body can be in two places at the same time. The only refuge I did not seek, was under the bed, and the evident reason for my not achieving that ignominious retreat was that my legs would have broken before I could have attained its friendly protection. Don't hint at a "*mauvais quart d'heure*." Less than two such "bad minutes" more than satisfied me and I am sure would have fully satisfied you.

The incident, which I can now blithely portray as a comedy, thus perhaps making its lesson less quickly forgotten, came perilously near to ending as a tragedy. Had the uplifted chair not been an impediment as well as a weapon, and had I not been forty years younger and forty pounds lighter, you would probably be listening to some other orator today.

In the case of women patients the rule never to give ether alone should be *absolute*, for delusional dreams do occasionally occur during anesthesia and are honestly believed after recovery. A charge of assault may easily follow either as a result of this sincere belief, or as a means of blackmail. If no witness was present the only evidence can be the positive assertion by A and the equally positive denial by B. How can the most intelligent jury be sure to decide aright? Moreover, if sudden death should occur, a third person as a witness would evidently be most desirable.

Unfortunately I have to confess my own delinquency in not keeping any record of my etherizations. I must, therefore, rely upon my own and my assistants' memories as to any fatalities. Two deaths from chloroform stand out very clearly in my memory, and had I had any from ether I feel quite certain that I should not

have forgotten so deplorable an event. I have had several very narrow escapes, but after a most careful review of my cases and conferring with Drs. DaCosta, Taylor and Spencer, who have etherized at least 75% of all my cases, we are all four so fortunate as not to be able to recall a single case of death, either immediate or remote, from ether.

Three of my patients have almost been drowned by an "*inundation of mucus*." One was a boy three or four years old whose mouth, shortly after the operation was begun, looked as if he were blowing soap bubbles. The loud bubbling respiration and his cyanosis could not be misinterpreted. He was saved by the simple expedient of holding him upside down by his heels. Frothy watery mucus poured in a stream from his mouth and nose. In a few moments the operation could be resumed and was completed without further trouble. The second was a man who was similarly rescued by Dr. Taylor's mounting the table, placing the man's legs over his shoulders and thus almost completely inverting him. The third case—a woman—was fortunately in a hospital and on a suitable table. She was at once placed in the extreme Trendelenburg position and quickly relieved. I mention these because I have seen reports of several deaths during operation, which, so far as I could judge, might have been prevented by a similar simple treatment, which is always available.

This "drowning" by mucus, as Connell has pointed out, is most likely to occur in the narrow zone between a light subconscious anesthesia and a profound and asphyxial anesthesia. In that same zone also vomiting and consequent aspiration pneumonia are serious dangers.

The dangers on the cardiac side I need not describe in detail as Dr. Finney¹² considered them fully in 1901 and I have little to add. I may be allowed a moment only to say that I would far rather operate on a case with a bad heart than with bad kidneys. Finney also called attention to the infrequency of deaths from heart disease under ether as compared with their great frequency in the general community. Patients with any cardiac disease of course run greater risks than those with healthy hearts, but as Ochsner has well said, such cases "are safe because they are considered especially unsafe" and therefore extra care is given them.

The chief danger is from myocardial rather than from valvular disease. I may cite a single case as evidence that valvular disease may not be so great a danger as is sometimes believed.

The worst case of valvular disease I have ever seen I operated on in January, 1888,—a woman then 62 years of age with marked tricuspid and mitral regurgitation. I resected the inferior dental nerve for unbearable tic. Ether was very carefully given and no trouble arose. In 1895 at nearly 70 years of age, she required a second operation for a recurrence. Had I not

¹² Trans. Coll. Phys., Phila., 1901, 12.

done the first operation myself I might almost have doubted whether the jaw had ever been touched, so perfectly normal did the bone appear and so apparently normal were the nerve and its canal. Her valvular disease had become far worse. Prof. H. A. Hare kindly took charge of the ether. In both operations the Allis inhaler was used. During the second operation the external jugulars were enormously distended and the blood from the wound was very dark, especially toward the end of the operation. Hare writes me: "It was the most serious case of valvular disease that I have seen take an anesthetic. Neither have I ever seen such marked tricuspid regurgitation nor such extraordinary pulsation of the liver in any case, much less one that has been anesthetized. It is interesting to note that the administration of just enough ether to keep her under acted as a stimulant to her heart so that her pulse improved. It was only toward the latter part of the operation that the regurgitation became so great that intense cyanosis developed." Yet she was out of bed on the third day and went home on the sixth. She died two and a half years later. She was a patient of Drs. S. Weir and John K. Mitchell. The latter made the *post mortem* and reported that the right auricle itself was as large as a good sized heart and held the entire fist. The mitral orifice admitted the tips of four fingers, the tricuspid the thumb and three fingers. The pericardial sac was entirely obliterated.

The *respiratory dangers* are even more to be feared than the cardiac. During anesthesia the chief danger is paralysis of the respiratory center; after anesthesia a post-operative pneumonia.

The studies of Haldane, Priestly, Poulton and others in England and of several observers, notably Yandell Henderson of Yale, in this country have brought prominently before the profession the danger of *Acapnia*, i.e. the lack of carbon dioxide.* This gas, formerly regarded only as a noxious waste product, is now believed to be the irritant which calls into activity the extremely sensitive respiratory center.†

Poulton¹⁷ by forced breathing for two and a half minutes before the British Physiological Society, produced such a dangerous acapnia in himself that several of the physiologists expressed alarm for his life and at least one had to leave the room.

When a patient struggles or screams while being etherized, thus over-ventilating the lungs and dangerously diminishing the carbon dioxide, if

the etherizer becomes nervous and gives the ether intermittently, and especially if in these conditions any considerable amount of ether be suddenly poured on the inhaler, it may easily be enough to cause death by reason of its concentration. It must be clearly understood that not the amount of ether inhaled, but its concentration in the respired air, is the chief danger. Even two or three deep inspirations in such conditions are fraught with danger not only to the respiration but to the heart.¹⁸ Herein lies one of the chief merits of the Connell anesthetic, as such a sudden concentration is impossible.*

In acapnic cases Henderson suggests a very simple means of temporary re-breathing in order to supply the needed carbon dioxide by holding a (grocer's) paper bag over the mouth and nose for a time. In an emergency the two hands could be placed over the patient's mouth.

It is also possible that not only may there be an insufficiency of the stimulating carbon dioxide but in certain conditions there may be a reduction in the irritability of the respiratory center itself which may add to the danger.† Future experimental research may reveal more clearly these causative conditions and also the means of avoiding them.

"The great hyperpnea produced by a rapid fall in the oxygen pressure of the inspired or alveolar air is not due to the direct effect of want of oxygen on the respiratory center, but to that of the carbon dioxide present. . . in the blood. The action of this carbon dioxide is reinforced by the acid or other products produced by the want of oxygen, so that the threshold pressure at which the carbon dioxide excites the center is lowered."¹⁹

But besides its effect on the respiratory center, an excessive loss of carbon dioxide, it is claimed,²⁰ produces paresis of all unstriated muscular fibers, including those of the vascular system. The blood then accumulates in the internal vessels, and so is followed by facial pallor instead of normal pinkness. To guard against this paresis and consequent pallor Bryant and Henderson,²¹ who regard acapnia and anoxemia as "the anesthetist's Scylla and Charybdis," propose that his "sailing orders" should be "keep the patient pink." Whether this theory is correct or not, the order is well worth obeying. Under the Equator, however, and in our equatorial fellow citizens I fear that it would hardly be an attainable tint.

In the intestines, it is claimed that this paresis of the unstriated muscle halts peristalsis, thus

* Henderson has a series of valuable papers in the Amer. Jour. Physiol., 1906-1911, Vols. xxi-xvii. That on Acapnia and Anesthetics, is in Vol. xxvi, p. 386.

† As noted by Campbell, Douglas, Haldane and Hobson (Jour. Physiology, 1912, Vol. xvi, p. 301) the facts recently brought forward by Hesselbalch point clearly to the conclusion that what the respiratory center really responds to, when it responds to CO₂, is the balance of H-ion concentration in the blood; and as an increase of 2 m.m. of CO₂ pressure corresponds to a scarcely measurable increase in the H-ion concentration of blood, it follows that the respiratory center is extremely sensitive to changes in the H-ion concentration. (See also Douglas and Haldane, Jour. Physiol., 1909, Vol. xxxviii, p. 430.)

¹⁷ Johns Hopkins Hosp. Rpts., August, 1910, p. 235.

* The foregoing and some other later statements seem simpler and more easily understood by others than physiologists than if they were in every detail more technically exact.

See the admirable paper by Penbody, "Studies on Acidosis and Dyspnea in Renal and Cardiac Diseases," with references to other papers. Arch. Int. Med., August, 1914, Vol. xiv, p. 236.

¹⁸ Henderson, Trans. Amer. Surg. Assn., 1911, p. 234.

¹⁹ Haldane and Poulton, "Effects of Want of Oxygen on Respiration," Jour. Physiol., 1908, Vol. xxvii, p. 390.

²⁰ Henderson, Amer. Jour. Phys., 1909, Vol. xxiv, p. 66; and Hooker, Amer. Jour. Phys., 1911, Vol. xxvii, p. 361, and Vol. xxvi, p. 47.

²¹ Jour. Amer. Med. Assn., July 3, 1915, p. 1.

causing the gas pains which sometimes are a post-operative complaint and may be a serious danger.* But if acapnia is prevented by a preliminary dose of morphin and atropin and by moderate rebreathing during etherization, normal peristalsis, it is claimed, will persist at the end of a laparotomy.

The greatest respiratory danger of ether is *post-operative pneumonia*. While ether itself is, I believe, a moderate irritant to the air passages (in spite of Rovsing's assertion), undoubtedly the principal cause of such post-operative pneumonia is aspiration of the contents of the mouth. Kelly²² of Liverpool and Hölcher²³ by putting coloring matters in the mouth have placed the fact of such aspiration beyond doubt. Kelly has shown equally clearly that one of the great advantages of endotracheal insufflation is that this aspiration practically does not occur.

The aspirated matter will consist of the oral mucus (not seldom, be it remembered, laden with the pneumococcus), the discharges from any lingual, oral, dental or tonsillar ulcer or abscess, and the contents of the stomach, which have been vomited but not wholly ejected. Hence the necessity too little appreciated both by surgeons and anesthetists of getting the mouth, tongue, teeth and tonsils in proper condition before operation.†

Besides this, the utmost care should be used by the anesthetist to prevent vomiting if possible. "If on minimal [not, observe, maximal] dosage, the breathing becomes shallow with an occasional deep breath," vomiting is impending. (Connell.) Should it occur, the anesthetist should promote the speedy and complete escape of the vomitus by turning the head sidewise in extension and thus prevent or diminish aspiration. The prevention of aspiration pneumonia lies largely in the hands of the anesthetist. One of my correspondents confesses to having had two deaths on the table from inhalation of the vomitus during recovery from the ether.

But we must not attribute all the pneumonias which follow ether to the irritation of the ether itself, to its mode of administration or even to aspiration. Armstrong²⁴ has shown that pneumonias are especially frequent in cases of septic foci existing at the time of operation and attributes these pneumonias largely to septic emboli, an opinion re-enforced by Beckman²⁵ of the Mayo Clinic. In operations in the upper abdomen such emboli are especially to be feared. This is due partly to the natural inhibition of diaphragmatic breathing and therefore of full expansion of the lower part of the lungs by reason of the pain.

* Such "gas pains" have not been very common in my own experience and observation.

† I have seen foul roots of old teeth which should have been removed some days before the operation extracted by the surgeon at the end of an operation.

²² Brit. Med. Jour., 1912, Vol. ii, p. 17.

²³ Arch. klin. Chir., 1898, Vol. lvii, p. 175.

²⁴ Brit. Med. Jour., May 19, 1906, p. 1141.

²⁵ Annals of Surgery, 1912, Vol. lvii, p. 718.

Pneumonias may also follow local anesthesia, in which there can be no question of aspiration. Gottstein²⁶ and Mikulicz²⁷ both report larger percentages of pneumonias after local anesthesia than after general anesthesia. The experience in the Mayo Clinic confirms this observation. The probable reason is that the weaker and more serious cases have had local anesthesia. "Most of the lung complications have developed in patients who have been operated on for carcinoma, especially of the stomach, and the autopsy has shown fine metastatic growths in serial sections of the lungs.*"

Anuria fortunately is not a very frequent sequel of ether, but is a very serious one. Ether as a rule decreases the urine for a day or sometimes longer. I always watch the bedside chart with anxiety for the first two or three days to ascertain the urinary output. As a rule after 24 or 48 hours there is a moderate increase. I have lost two patients from anuria. The first was a case of nephro-lithiasis, occurring unfortunately just a year before the discovery of the x-rays. I knew of course of the moderate frequency of bilateral renal calculus, and that temporary suppression sometimes followed unilateral nephrotomy. In this case during the first 28 hours after the nephro-lithotomy only eleven ounces of urine in all were secreted; in the next four days only twenty-five to twenty-eight ounces daily. In spite of vigorous treatment, the amount fell to fourteen, and then to three and a half ounces with absolute suppression for the last 36 hours. She died on the eighth day. I had anxiously considered the question of an exploratory operation on the other kidney, but there was absolutely no clinical evidence of any stone there. If no stone were found at a second operation and she had died, I should forever have had a burden on my conscience. The x-rays would have decided the question and might have saved her life, for a calculus in the other kidney was found at the *post mortem*.

The other case had a large sarcoma of the shoulder. Removal of the entire half shoulder girdle was the only possible operation. He died in 31 hours, never having secreted a drop of urine.

Chace²⁸ reports the examination of the urine in 125 consecutive cases. Two cases—with no albuminuria before operation—died from suppression on the seventh day. In the great majority both of normal and abnormal kidneys there is happily only a temporary diminution, but the amount of the urine should always be most carefully recorded and vigilantly watched.

At present it is impossible to predict such suppression. The remedies, such as they are, are well known but may easily be of no avail.

Glycosuria also may follow etherization, as was first shown in dogs by Hawk²⁹ in 1904. As

* Letter from Miss Henderson.

²⁶ Arch. klin. Chir., 1898, Vol. lvii, p. 409.

²⁷ Verhandl. Deutsch. Gesellsch. Chir., 1901, Part ii, p. 560.

²⁸ Postgraduate, N. Y., 1904, Vol. xix, p. 802.

²⁹ Arch. Int. Med., July, 1911, Vol. viii, p. 39.

a rule it is only temporary. Hawk and his associates have shown that this glycosuria, at least in dogs, is especially dependent on diet. A carbohydrate-free diet always was followed by glycosuria while after a mixed diet there was none. That this glycosuria is not wholly the result of etherization (at least in cats) but may be in part an "emotional glycosuria," caused by the excitement attending operation, was first pointed out by Cannon,* and has since been confirmed by others both in this country and in Germany. Henderson and Underhill²⁰ attribute the glycosuria to acapnia. Higgins and Ogden²¹ have shown that injuries of the head were followed by glycosuria in nearly 10% of the cases.

In diabetes it would therefore be advisable to use nitrous oxide and oxygen or, if possible, local anesthesia, since ether might precipitate a fatal diabetic coma.

Acidosis. Recently the dramatic fatal cases reported by Brewer, Beesly and Bevan, and the researches of Crile, Hawk, Bevan and Favill; of your Boston men, Ladd and Osgood, Peabody, Kelly, Brackett, Stone and Low, and numerous others, have focussed attention upon acidosis and its various results, especially acetonuria.

Could anything be more distressing than such a case as Brewer's?²² A boy of 12—a successful operation for appendicitis—everything practically normal till the third night after operation. Then pulse, temperature, and wound all being normal, sudden attacks of terror awaking him from sleep, his screams heard all over the building, increasing somnolence in the intervals, next a sweetish breath, repeated vomiting, acetone and diacetic acid found in the urine and death in 32 hours after the first piercing scream! Such a case breaks a surgeon's heart.

The pathological changes in acidosis are especially pronounced in the liver, so much so that Bevan and Favill call it an "hepatic toxemia." Crile† and others have shown that this is a local pathological instance of a more widely distributed normal process. All the activities of the body, every "transformation of energy" produces acid by-products, which in turn must be neutralized if life is to be sustained. The kidney, as pointed out by L. J. Henderson,²³ separates the non-volatile acid from the base of these acid by-products of metabolism, excretes the acids in solution and returns the bases to the blood to be used over again in neutralizing additional acid. The volatile acid—carbon dioxide—escapes by the lungs. The H-ion concentration of the blood (Ph) is an index of the acidity of the blood and of its carbon dioxide²⁴ content. This carbon dioxide stimulates the respiratory center

and also causes an increased output of adrenalin. Crile claims that his histologic and chemical studies have shown that the changes in acidosis are limited to the brain, the adrenals and the liver. Certainly these organs and especially the liver do show marked changes. "While in acidosis the H-ion concentration of the blood is not altered, its *reserve alkalinity* (i.e. the ability to retain normal reaction despite the addition of acid) is decreased to a measurable amount."²⁵ Carbohydrate starvation especially favors acetonuria.

Kelly²⁶ examined the urine in 400 cases in the Boston City Hospital and found 46 which showed acid intoxication in 17 different disease conditions. Ladd and Osgood²⁷ in their important paper showed that in 120 patients etherized with the Blake cone, acetonuria was found in varying degrees and proportionate to the length of the etherization in 106 (88.5%), whereas in 102 by the open method this percentage fell to 26%, or less than one-third as many as when the cone was employed—a very serious indictment of the cone method. Gatch²⁸ has emphasized this danger and I think explained the reason for it.

In some cases the symptoms,—persistent vomiting, sweetish (acetone) odor of the breath, peculiarly pink lips, dry tongue and mouth, give us warning. Examination of the blood and urine will convert suspicion into certainty.

The administration of water, glucose and sodium bicarbonate, the lessening of all physical and psychical conditions which increase the transformation of energy are the best preventive remedies. If there is no manifest and speedy improvement no general anesthetic should be given. Local anesthesia should be employed.

But in not a few cases no symptoms whatever betray its approach until the storm bursts in all its fury. Future studies and experiments on animals it is to be hoped may furnish us with warning signals that may enable us to prevent or vanquish this not very common but terrible danger.

What now is the conclusion of the whole matter? In my opinion "straight ether" by the open drop method on an Allis inhaler or a simple mask is by far the best and safest routine anesthetic. I am glad that such staunch upholders of more elaborate and accurately scientific methods of administration, as Boothby and Connell, both upheld this dictum. This is especially the method of choice for doctors who only occasionally give an anesthetic, because the margin of safety with ether is so wide.

In some clinics from which I have replies in exact figures, many thousands of patients have been etherized especially by this method without

* Proc. Amer. Philosoph. Soc., 1911, p. 227, and Amer. Jour. Physiol., 1911-12, Vol. xxix, p. 261.

† Influence of Inhalation Anesthesia on Acidity of Blood, etc., Annals of Surgery, January, 1915, p. 6; Phenomena of Acidosis, etc., Trans. Amer. Surg. Assn., 1915, both by Crile.

²⁰ Amer. Jour. Physiol., 1911, Vol. xxviii, p. 275.

²¹ Boston Med. and Surg. Jour., Feb. 21, 1898, p. 197.

²² Annals of Surgery, 1902, Vol. xxxvi, p. 481.

²³ Jour. Biol. Chem., 1911, Vol. ix, p. 403.

²⁴ Peabody: "Studies on Acidosis and Dyspnea in Renal and Cardiac Disease," Arch. Int. Med., August, 1914, Vol. xiv, p. 236.

²⁵ Van Slyke, Stillman and Cullen, Proc. Soc. Exp. Med. and Biol., 1914-1915, Vol. xii, p. 165.

²⁶ Annals of Surg., 1905, Vol. xli, p. 161.

²⁷ Annals of Surgery, 1907, Vol. xlii, p. 480.

²⁸ Since the delivery of this address an interesting statistical paper on the "Examination of the Urine in 214 Consecutive Cases in Deaver's Clinic" by Bradner and Reisman has been published in the American Journal of Medical Science, Nov., 1915, p. 727.

²⁹ Trans. Amer. Surg. Assn., 1911, p. 198.

a death. Alice Magaw (Kessel) and Florence Henderson have to their credit respectively 22,000 and 20,000 administrations without a death. But other clinics have a mortality of one in 5000, one in 3000 to one in 451,* thus bringing the average mortality down to 1 in 7706. Inclusion of the late deaths would make the proportion much less favorable.†

Evidently we ought to and must attain better results, especially when the British surgeons and anesthetists have shown us that they can be realized. To attain these better results we need in my opinion:

1. Many professional anesthetists.
2. The use of an anesthesia chart in all cases.
3. The collection of statistics, best by the American Surgical Association at intervals of five years.
4. Instruction of all medical students in the theory and practice of anesthesia.
5. Straight ether by the open drop method as a routine method instead of mixtures and sequences. I believe all of the latter to be more dangerous than ether.

6. More accurate dosage of the ether by the anesthesiometer as a gas on the basis of its anesthetic tension, i.e. the partial pressure of the ether vapor in the respired air.

Meyer and Gottlieb[‡] frankly attribute the great majority of accidents to "faulty management and incautious dosage of the anesthetic" and again (pp. 74-5) to "the administration of too high concentrations of the anesthetic." A knowledge of this concentration or "anesthetic tension" cannot be obtained by observation. It must be by exact measurement in millimeters of mercury.

In spite, therefore, of the splendid results in certain most competent hands, I believe that others less skilled would achieve better results by some such "instrument of precision," and the most skilled and successful would find great comfort in this more exact knowledge.

Science began with the substitution of the balance, the yardstick and the clock, for even the most accurate guesses as to weight, dimension and time. In anesthesia the same I feel *must* hold good.

Of all the apparatus I am acquainted with, the Connell anesthesiometer appeals to me as the best. It deals with ether in the form in which it actually reaches the patient's lungs, that is as a gas and not as a liquid. The tension is easily and quickly regulated according to the needs of the patient. The alcoholic, the child, and the

adult all require to be saturated to the same ether tension in order to saturate their tissues up to the point of anesthesia.

Inquiry as to whether any deaths had occurred in cases in which the anesthesiometer had been used disclosed only one, a patient at the Brigham Hospital operated on by Dr. Harvey Cushing. Dr. Walter M. Boothby, than whom no one could be more careful or more skilful, gave the anesthetic. The patient was a man with a very large cerebellar tumor pressing upon the medulla. He died from respiratory failure eight minutes after the beginning of the anesthesia. It is very clear, I think, that neither anesthetist, the anesthetic, nor the apparatus was responsible for the fatal result. It was due to the situation and size of the tumor.

I have never seen so smooth an etherization as one by Boothby with the anesthesiometer for nearly two hours in one of Cushing's brain cases. The patient's breathing was inaudible throughout, in sharp contrast to the moderately stertorous breathing and coughing of another patient anesthetized elsewhere a few days later by the Roth-Dräger apparatus. The anesthesiometer looks complicated, but its management is easily mastered and it then fulfils exactly the requirements just quoted. In fact, I think it is the only apparatus that does. It will be useful only to those who can afford the expense and who are constantly engaged in giving ether, especially in hospitals. It will not supplant the open drop method as a routine method to be used by the great majority. The very accuracy of the apparatus is a temptation to place too implicit reliance upon it, forgetful of the fact that the reaction of the patient and the disease cannot be accurately predicted.

EVERY CASE OF ANESTHESIA IRRESPECTIVE OF THE METHOD EMPLOYED REQUIRES UNREMITTING WATCHFULNESS FROM FIRST TO LAST.

Endotracheal and endopharyngeal insufflation are most valuable additions to our methods.*

Thoracic surgery, which for years had lagged behind all other departments of regional surgery, has suddenly broadened and improved by leaps and bounds, as a result first of the differential pressure chambers and later of insufflation methods, so that now all the organs in the chest are freely accessible. One important note of caution sounded by Cotton and Boothby[§] I must repeat and loudly,—there must always be provided a *safety valve* to prevent excessive pressure and serious damage to the lung and the right heart.

What of the future? New anesthetics and improvements in our present methods, possibly even the discovery of the ideal anesthetic, will give us, I hope, a new, a safe and an agreeable

* As to this report from one of the ablest of American surgeons, it is but just to state that he only recently began to keep systematic anesthesia records. It is evident from the details he gives that very exceptional cases happened to be operated on during the short period since he began his records. We must all admire his honesty in giving the exact figures.

† All the British and American figures as well as Gurli's and Rossing's (see page 832) are to some extent a matter of definition of what is a "death from ether." One surgeon (or anesthetist) would admit and another reject the late pneumonias and alleged "status lymphaticus" (Henderson, Trans. Amer. Surg. Assn., 1911, p. 230), those from intercranial pressure, suppression of urine, etc.

‡ Pharmacol. Clinical and Exp., Translated by Hasley, Lippincott, 1914, p. 68.

* The hybrid Latin and Greek terms "intra-tracheal," "intra-pharyngeal," etc., should be discarded for "endotracheal," "endopharyngeal," etc., derived wholly from Greek. Trachea, pharynx, etc., are not Latin words, but simply Greek terms transferred into Latin as we have transferred menu, chauffeur, etc., into English. Imagine our writing "intra-carditis" or "intra-metrium"!

§ Boston Med. and Surg. Jour., March 23, 1912, p. 486.

anesthetic ere the centenary of anesthesia occurs on October 16, 1946.

Finally: In glorious, yea inspiring, contrast to the work of destruction promoted by other departments of Science, as shown in the present horrible war, is the blessed work of our Guild. In war as in peace, winning victory after victory over disease and death, we devote all our knowledge, skill, and ingenuity, century after century, to the solace and service of Humanity.

Original Articles.

PREGNANCY AND DIABETES MELLITUS.

By ELLIOTT P. JOSLIN, M.D., BOSTON.

[From the Department of Theory and Practice, Harvard Medical School.]

A SMALL quantity of sugar in the urine during pregnancy is so common an occurrence as to attract comparatively little attention, and the frequency with which it is met probably depends upon how often it is sought. As a rule in such cases the sugar permanently disappears soon after confinement, although it may recur with succeeding pregnancies, and ultimately a severe form of diabetes may develop. With our present knowledge it is quite possible that such an outcome could be prevented by active treatment of the glycosuria from the very start.

The gloomy outlook for pregnant women showing large quantities of sugar became somewhat modified when it was recognized that these cases could be divided into two groups, based on the appearance of sugar before or after the pregnancy began. If pregnancy occurred in diabetic patients the outlook was considered far more serious than when diabetes first appeared during pregnancy. A somewhat more hopeful view of the whole situation was taken by Eshner (*American Journal of Medical Sciences*, 1907, Vol. 134, p. 375) and by Stengel (*Penn. Med. Journal* 1907-8, Vol. 11, p. 960), and still more recently by Neuman (*Ztsch. für ärzt. Fortbild.*, 1913, Vol. 10, p. 367), who reported six successful cases.

The experiments of Carlson and Günzberg (*American Journal Physiology*, 1914, Vol. 36, p. 217) are interesting rather than encouraging. Whereas total extirpation of the pancreas in non-pregnant dogs results promptly in the onset of pancreatic diabetes, complete pancreatectomy in pregnant bitches near term is not followed by hyperglycaemia and glycosuria as long as the fetuses are alive and the placental connections are not severed. At the onset of labor blood sugar begins to rise and characteristic

pancreatic diabetes is established on the completion of the delivery.

It is not surprising that so little progress has been made in the treatment of pregnant women with diabetes, because progress in the treatment of uncomplicated diabetes has been slow. However, the introduction of the therapeutic methods of Naunyn and von Noorden, who incorporated in their own the best of former modes of treatment, brought about improvement, and pregnant patients with sugar in the urine have now been subjected to the same kind of rational treatment which is employed with considerable success in ordinary cases of diabetes, and of course these methods have been greatly improved of late by Allen's rational development of Guelpa's work. But it is only fair to say that the general practitioner still has a horror at the discovery of a considerable quantity of sugar in the urine during pregnancy. For this reason, I shall record in detail Case No. 812, in which diabetes of moderate severity occurring during pregnancy was successfully treated, and I shall refer to another case (Case No. 307) seen in consultation with Dr. J. G. W. Knowlton, and an unusual case (Case No. 106) seen many years ago with Dr. F. W. Taylor, which he then treated most carefully according to the method of treatment then generally employed. In addition, I can report two severe cases (Cases Nos. 608 and 671) in young women, which were unsuccessful but might have progressed more favorably, and another case (Case No. 604), which was not severe, but was neglected and died with uremic complications. Finally, there is Case No. 854, alive, but with one unsuccessful pregnancy. Among these severer cases there were ten pregnancies and three children who are alive and well. In the same connection, a group of seven cases of pregnancy, in two of which (Cases Nos. 698 and 318) small quantities of sugar were found before conception took place, but in all of which sugar was moderate throughout, will be summarized. Among these cases there are eleven pregnancies and nine children are well at present. Such a record does not appear on the whole encouraging, but a study of the case histories leads to quite the opposite conclusion.

DIABETES.

Moderate or Severe.	Mild.
Nos. 812	Nos. 256
307	732
106	712
608	698
671	318
604	438
854	788

CASE No. 812, a physician's wife, aged 31 years, first seen December 29, 1914. The examination of the urine showed a slightly acid reaction, specific gravity 1088, no albumen, sugar 6.4%, no diacetic acid. There was no family history of diabetes; the patient had had measles, mumps, whooping cough,

and a rather peculiar case of typhoid. She was married at 21, and one year later had a stillborn child. In June, 1914, she became pregnant. Shortly afterwards her husband was called away from home. Upon his return in December, 1914, during the sixth month of pregnancy, sugar was found in the urine, but it was impossible to determine when it first appeared.

The patient felt well except for slight dyspnea, presumably due to her condition; polydipsia and moderate polyuria existed, but the appetite was decreased rather than increased; the bowels were constipated. Physical examination: the highest weight was 179, and the present weight 169 pounds; normal pupillary and patellar reflexes; heart normal; pulse 100; blood pressure 130; considerable oedema of the lower extremities, especially the right leg, and an abdomen consistent with a pregnancy of six months.

The case appeared to me most favorable to attempt to carry through to term. The patient had previously been fat, and this spoke for a mild character of the disease. The polyuria was not great, although the per cent. of sugar was high. Furthermore, the patient was a doctor's wife. Both she and her husband thoroughly appreciated the situation, each had a cheerful temperament and instantly showed that they would follow directions. I was especially encouraged to allow the pregnancy to go on because of many favorable results with even severe diabetic patients undergoing major surgical operations. It was agreed that the patient should enter the New England Deaconess Hospital and remain there until danger was over or until confinement occurred.

The obstetrical side of the case was placed in the hands of Dr. J. C. Hubbard, who wrote me on January 7, 1915, as follows: "It seems to me that the problem offered by this case is one to be solved by you. Obstetrically she is in excellent condition and there is no reason why she should not go through her confinement all right. I feel that I am not qualified to express an opinion about how much the presence of sugar complicates the situation. From my point of view, however, one must remember this,—that should it seem advisable to you to end the pregnancy now, the difficulty in starting uterine contractions and bringing on labor might put her through almost as much as a delivery at full term, either normal or hurried as much as possible."

During the week intervening between the first visit and the entrance of the patient to the hospital, no alteration in the diet was made, and from the accompanying chart it will be seen that the percent of sugar underwent no change.

Following entrance, the carbohydrate in the diet was gradually decreased from approximately 130 grams to 45 grams and the patient was allowed a very moderate quantity of protein and fat. Sugar then disappeared, but the diacetic acid rose to three paces and the ammonia, which at entrance was 1.3 grams in 24 hours, rose to 3.0 grams. With 8.0

grams of sodium bicarbonate and a slight increase in the carbohydrate, the ammonia fell to normal, where it remained until just after confinement. The sodium bicarbonate was eventually omitted. The tolerance for carbohydrate rose to 100 grams. The protein was kept in the neighborhood of from 75 to 100 grams—a little over 1 gram per kilogram body weight.

When it was seen that the acidosis did not wholly disappear upon this diet, the total quantity of food, which was largely in the form of fat, was decreased to such an extent that the patient was kept from gaining weight. In other words, when one considers the co-existent pregnancy, the patient was kept upon an undernutrition diet.

The weight at the time of confinement, March 24, 1915, was 156½ pounds, as compared with 157¾ pounds at the sixth month. During the last three months of pregnancy the patient was in as good health as any normal pregnant woman. She had the freedom of the hospital, took daily walks, and by her cheerful temperament contributed much to the happiness of other diabetic patients with whom she was associated. As I had lost no case of diabetes in this hospital since August 29, 1914, she gained confidence in the manner of treatment.

The blood sugar on February 13, 1915, after dinner, amounted to 0.25%. The urine upon this day showed a non-quantifiable trace of sugar by the Benedict test, and there was a trace of diacetic acid. The carbohydrate ingested was 110 grams. On February 18, 1915, fasting, but with the same quantity of carbohydrate in the diet, the blood sugar was 0.16%. The urine still showed a trace of non-quantifiable sugar, and the diacetic acid persisted.

The method of delivery was carefully considered by Dr. Hubbard, who finally advised a Caesarean section, as set forth in his letter of February 8, 1915: "One more word about the method of delivering this patient. From my point of view it would seem desirable to have the labor put her through the least possible strain. It is not at all probable, I imagine, that she will have any more children, therefore the delivery should take the least possible chance with the baby. A Caesarean fulfils both these requirements. It saves the woman all muscular exertion. She gets through with less ether, and it is the easiest possible way for the baby, for there is no risk of twisted cord, which may occur in even the most easy vaginal delivery. A Caesarean would be done on a definite date. Would such a definite time be of any advantage to you in the way of dieting her in preparation? The time for the beginning of labor normally would, of course, be far from definite. You see I favor a Caesarean. If you should agree, I should like to have an opportunity of talking with her and explaining the necessity for suggesting such a delivery." The advice was accepted by the patient and the Caesarean was performed on March 24, 1915, the approximate normal date for confinement. In my absence immediately prior to delivery, as well as for the next few days, the patient was under the care of Dr. F. Gorham Brigham, to whom I am much indebted.

CASE NO. 812.

Date.	Diabetic Acid.	Nitrogen.	Ammonia.	%	SUGAR. Total Grams.	Carbohy- drate Grams.	Carbohy- drate Balance Grams.	Blood Sugar.	NaHCO ₃ Grams.	Weight. Mother. Lbs.	Child. Lbs.
1914 Dec. 29	0			6.4					0		
1915 Jan. 5	+			6.4					0	157%	
5-6	+		1.3	2.4	31	120	+ 90		0		
6-7	+			3.0	40	130	+ 90		0		
7-8	sl. +			1.4	20	120	+100		0		
8-9	+++		0.5	0.4 (levo.)	tr.	30	+ 30		0		
9-10					0	45	+ 45		8		
10-11	+++				0	45	+ 45		8		
11-12	+++		3.0	0.4 (levo.)	0	45	+ 45		8		
12-13	+++			0.0	0	40	+ 40		8	100%	
13-14	+++			0.4 (levo.)	0	55	+ 55		12		
14-15	+++++		2.2	0.2 (levo.)	0	65	+ 65		12		
15-16	+++++				0	70	+ 70		12		
16-17	+++++				0	75	+ 75		12		
17-18	+++			0.6	0	85	+ 85		8		
18-19	+++				0	80	+ 80		8		
19-20	++			0.4 (levo.)	—	85	+ 85		4		
20-21	+		1.1	0.2 (levo.)	0	90	+ 90		2		
21-22	++				0	90±	+ 90		2		
22-23	++				0	95	+ 95		2		
23-24	++			0.2 (levo.)	0	100	+100		2	157%	
24-25	++			0.0	0	100	+100		2	156%	
25-26	+			0.2 (levo.)	0	100	+100		2		
26-27	+			0.2 (levo.)	0	100	+100		2		
27-28	++			0.0	0	100	+100		2		
28-29	++				0	100	+100		2		
29-30	++			0.4 (levo.)	0	100	+100		2		
30-31	+++			0.2 (levo.)	0	100	+100		2		
Feb. 31-1	++			0.0	0	100	+100		2		
1-2	++			0.2 (levo.)	0	100	+100		2		
2-3	0			0.0	0	100	+100		0		
5-6	tr.	10.6		+	0	110	+110		0		
								After Dinner			
13-14	tr.			tr.	—	110	+110	0.25%	0	157	
15-16	tr.	9.8	1.3	0.6 ferm.	7	110	+105		0		
				tr.				Fasting			
18-19	tr.			+	0	110	—	0.16%	0		
23-24	+		1.6	0.2	—	110	—		0		
27-28	+			0.4	8	144	+135		0		
Mar. 3-4	tr.			0.3 ferm.	4	140	—		0		
4-5	tr.		0.6	0.0	0				0		
8-9	tr.		1.0	0.0	—				0	157%	
18-19	0	12.7	1.0	0.0	0				0		
19-20	sl. +	12.4		0.2 (levo.)	0				0		
20-21	sl. +	12.6		0.2 (levo.)	0				0		
21-22	sl. +	10.9		0.0	0				0		
22-23	sl. +	12.0		0.2 (levo.)	0				0		
23-24	0	11.3	0.9	0.0 (levo.)	0	130	+130		0		
24-25	+++	8.8	0.8	tr.	0	5	+ 5		0	Delivery	8
25-26	+++	14.1	2.2	0.6 (levo.)	3.0	25	+ 22		0		
26-27	+++++	8.7	1.8	0.8 (levo.)	0	0	+		10		
27-28	++	7.4	2.1	1.2 (levo.)	1	30	+ 29		2		
28-29	++	12.3	1.5	0.0	0	60	+ 60		1		
29-30	+	13.5	1.1	0.0	0	70	+ 70		0		
30-31	+	14.3	1.9	0.0	0	70	+ 70		0		
April 31-1	+	13.8	1.1	0.0	0	85	+ 85		0		
1-2	+			0.0	0	85	+ 85		0		
7-8	+++			1.1	0.2 (levo.)	0	82	+ 82			
8-9	+		0.95	0.0	0	77	+ 77		0		
11-12	0			v. sl. +	0	82	+ 82	Fasting	0		
22	+			v. sl. +	0			0.20%	0		
May 20	0			0.0	0				131½	7%	
June 4	0			0.0	0				130½	9½	
18	0			0.0	0				128½	10½	
July 8	0			0.0	0				129	11½	
									126	11%	

The reaction of the urine was acid throughout. Albumen at no time exceeded the slightest possible trace, and casts were never present in the sediment except just after delivery.

The urine for the 24 hours preceding the operation was as follows: 1710 c.c., specific gravity 1012, acid, slightest possible trace albumen, nitrogen 11.3 grams, ammonia 0.9 grams, no sugar. In the sediment there were no casts or pus and only an occasional red blood corpuscle. The diet for the same day contained about 120 grams of carbohydrate, and was as follows:

Breakfast. Bacon, 2 eggs, 1 orange, 30 grams bread, 15 grams oatmeal, 120 c.c. milk.
Dinner. 90 grams roast beef, carrots and peas, 120 c.c. milk, coffee jelly (made without sugar) 15 grams nuts, 1 apple.
Supper. 1 egg, asparagus, 15 grams oatmeal, 120 c.c. milk, 15 grams toast, $\frac{1}{2}$ orange, 60 grams potato.

The blood pressure, which was 130 on December 29, 1914, had remained essentially the same, and was 125 on the day before delivery.

It had been previously agreed that if acidosis developed prior to the termination of labor a Caesarean section would be performed under local anaesthesia. Fortunately, this was not necessary.

During the 24 hours following delivery a trace of sugar appeared in the urine, but the ammonia remained at 0.8 grams and the nitrogen at 8.8 grams. Diacetic acid was present, and the sediment showed numerous brown granular and a few hyaline casts. Upon the second day there was 0.2% of sugar by the Benedict test, but the urine was 0.6% levorotary on account of the acidosis, which was proven by the presence of 2.2 grams of ammonia and a marked diacetic acid reaction. The sediment showed an occasional hyaline cast. Upon the third day the urine showed only a trace of sugar, but was 0.8% levorotary, the ammonia was 1.8 grams and the nitrogen 8.7 grams. Upon the fourth day it was essentially the same; there were no casts. Thereafter, the sugar disappeared, and up to October, 1915, has never returned in a quantitative amount.

Upon the day of delivery and the two following days the patient was practically fasted on account of the return of sugar and diacetic acid. The diet was then gradually increased, beginning first with a small amount of carbohydrate and protein, and the fat was limited to approximately 50 grams. Within a week the diet had been brought back nearly to what it was prior to delivery.

The baby was normal in every way. The weight at birth was eight pounds, and he steadily gained, reaching 13 pounds on July 30. It is frequently maintained that diabetic patients cannot nurse their babies, or that they ought not to nurse them. Nursing was easily maintained in this case until the middle of June, when the milk rather abruptly ceased. The patient was at that time in New Hampshire, and other circumstances may have played a factor to bring this about. The weights of mother and baby are recorded on the chart. The weight of the patient six days before delivery was 156½ pounds. On April 8, fifteen days after delivery, it was 130½ pounds.

Nitrogenous equilibrium was evidently maintained during the weeks before and after confinement.

The blood sugar on April 11, fasting, was 0.2%, in contrast to 0.16% on February 18, 34 days before confinement.

CASE No. 307, aged 34, first seen December 15, 1909, in consultation with Dr. J. G. W. Knowlton. The family history was negative. The first pregnancy began in May, 1909, and sugar was first discovered six months later, when the urine of November 30, 1909, showed specific gravity 1045, acid, no albumen, sugar 1.7%. Polydipsia, polyphagia and polyuria were present. Possibly the explanation of the appearance of sugar may be attributed to the diet, which was rich in carbohydrates—cakes, jellies and candy. There were no digestive, respiratory or nervous symptoms, but dyspnoea was present on exertion and also insomnia, which was attributed to pains in the legs, although oedema was absent.

Physical examination showed normal pupillary and patellar reflexes, no oedema, pulse 100, blood pressure 130. Apex of heart in mammillary line with a systolic murmur at the base. The abdomen presented a normal appearance for six months pregnancy. The former highest weight was 124 pounds, but at the sixth month of pregnancy it was 155½ pounds. The urine of December 15, 1909, showed specific gravity 1018, acid, no albumen, sugar 1.0% and diacetic acid slightly plus, no casts, pus or blood.

The patient was given the following diet: Strict diabetic diet, one and one-half pints milk, half a pint of cream, vegetables in the 5 and 10% carbohydrate groups freely, a tablespoonful of vegetables from the 15% group, one orange, one ounce of bread, two ounces of potato and two tablespoonfuls of oatmeal, or approximately 130 grams of carbohydrate.

On February 16, 1910, Dr. Knowlton reported that sugar disappeared on January 25, but was replaced by albumen and casts. The albumen increased to 0.3%. Anasarca appeared the first of February. Labor commenced at 3 a.m., on February 7, 21 hours later high forceps were used, but the baby was born dead. Sugar disappeared following confinement. In May, 1915, I learned that the patient had been severely ill with diabetes during the preceding winter.

It is worthy of attention that this patient survived confinement, despite the appearance of marked anasarca and 0.3% albumen. If Dr. Knowlton could be so successful at this period with such a case, it is obvious that with the advance in treatment of diabetes and nephritis during the last six years, still better results might be obtained. In the light of Case No. 812, reported above, it is possible that an early Caesarean section might have saved the child.

CASE No. 106, aged 39, was first seen on November 22, 1905, with Dr. F. W. Taylor, who reported the patient's last pregnancy in the BOSTON MEDICAL AND SURGICAL JOURNAL of March 2, 1899, Vol. 140, p. 205. The family history was negative. The patient was always well except for frequent micturition since childhood—a story frequently volunteered by diabetic patients—which became more marked at the age of 29. Married July, 1896, at the age of 30. Miscarriage the following September. The second pregnancy began in December of 1896, and

in June, 1897, 8.5% of sugar was found, which gradually decreased. On July 3, 1897, the urine was acid, specific gravity 1010, trace of albumen, no sugar. Labor began August 19, and the child was extracted with forceps; 13 years later this child was reported to be well-developed, vigorous and healthy. Two weeks after delivery the urine was again examined and found to contain sugar, which persisted. The patient was occasionally seen during subsequent years by Dr. Taylor and on March 13, 1905, the urine was found to contain 6.0% of sugar and no albumen. The weight of the patient was 108.

Pregnancy occurred for a third time in April, 1905, but this time the quantity of sugar was not as easily controlled as before. It is interesting that the patient was fasted one day by Dr. Taylor in his efforts to lower the sugar, and as a matter of fact it did decrease to 2.1%, but in August was 6.7%. In October, 1905, the sixth month of pregnancy, 5.8% of sugar was present. On November 20, the sugar had disappeared, but albumen had developed. Nausea was present and there was marked epigastric discomfort, so that the patient was accidentally fasted. Tenderness was present over the upper part of the uterus. The pupils were normal; there was no drowsiness or acetone odor; teeth fair; tongue slightly dry; heart and lungs normal; pulse regular, 104, with slightly increased tension. The uterus was well above the navel. It was decided to deliver the child at the very first sign of approaching coma, and three days later this was accomplished. Sugar remained absent from November 20 to 29. On November 27, two days after confinement, the nausea ceased and the patient began to eat. *It is interesting to note that accidentally starvation treatment was practised for a period of seven days.*

In December the urine showed 80 grains of sugar in the 24 hours, and pulmonary tuberculosis had developed. The percent of sugar, however, fell to between 1.0 and 3.0%, and in January was less than 1.0%, disappearing on January 15 entirely. On January 16, 1906, the patient died.

In Dr. Taylor's opinion, the diabetes developed during the second pregnancy. The favorable result of the second pregnancy despite the large quantity of sugar in the urine, even under therapeutic methods far inferior to those of today, encourages one in the treatment of other similar cases. The employment of starvation by Dr. Taylor in 1905 showed how carefully he treated the case, and the fact that the patient survived a third confinement, although extremely ill, may have some connection with the artificial seven days' fast which her nausea caused. Finally, the disappearance of sugar from the urine when tuberculosis appeared, is in accordance with what often happens, and is recorded by me in the *American Journal of Medical Sciences* (see Case No. 344, Vol. 4, p. 474) and still more in detail in *Carnegie Publication*, No. 176, p. 55, 1912, Case R. Benedict and Joslin, *Metabolism in Severe Diabetes*.

CASE No. 608, age 28, first seen April 23, 1913. The father has diabetes. One brother is deaf and dumb. Mother and one sister well. Nothing of note was recorded in the past history. In July, 1912, sugar was found, accompanied by polydipsia

and polyuria. The weight in August, 1912, was 174. Despite her knowledge of the existing diabetes, the patient married February 8, 1913, and promptly became pregnant. At the time of observation the quantity of urine was approximately 3000 c.c., and a single specimen on April 23, showed specific gravity 1030, very slight trace of albumen, 2.8% sugar, diacetic acid + + + +, no casts, pus or blood. On April 25, the urine amounted to 3000 c.c., acid, specific gravity 1026, slightest possible trace of albumen, sugar 3.0%, diacetic acid + + + +. When first seen the patient was drowsy, short of breath, and greatly annoyed by a parched tongue, thirst, constipation and bleeding hemorrhoids. She was weak and tremulous, all over. Pupils reacted and heart and lungs were normal; pulse 96 and blood pressure 115. The abdomen was negative save for tenderness in the right iliac fossa; the uterus was not felt.

It developed that soon after the discovery of the disease in July, 1912, the patient was put under dietetic treatment by a physician experienced in diabetes, but that recently she had given up treatment and placed herself under the care of a clairvoyant. The patient died in coma shortly after being seen. This case is recorded because it probably is typical of many others, and in part accounts for the gloomy prognosis usually held for pregnant diabetic patients.

CASE No. 671, age 25 years, first seen November 25, 1913, was a Jewish woman, who probably developed diabetes in April, 1912, although unrecognized by herself. She was married in June, 1912, and the disease was discovered in August, 1912. At the first visit the urine contained 7.2% of sugar. She was advised not to become pregnant, but pregnancy did take place in January, 1914. The urine did not become sugar-free, and an abortion was successfully performed by Dr. Friedman in March, 1914. I later learned that she again became pregnant and in October, 1914, committed suicide.

CASE No. 604 was seen by me once in consultation on April 14, 1913. The patient and baby were lost, but there is considerable reason to believe that they might have been saved. The age of the patient was 28 years. Her mother died of diabetic gangrene at 40, one sister became insane the first week of April, 1913, having shown sugar two years before; one sister died of Bright's disease with mental symptoms, and one sister was fat and well. The past history of the patient showed measles, mumps, whooping cough, chicken pox. She had been married eight years. Present illness: On February 22, 1909, sugar was found in the urine, but with dieting disappeared. The patient was free from sugar at the time of the first visit, as she had also been in the previous December. She became pregnant for the first time in February, 1913. On account of the family history of diabetes, which in my experience usually implies a mild type of the disease, on account of the absence of sugar and on account of the nervous upset which at that time the interruption of pregnancy would have caused, both because of her sister's case and her own first pregnancy, I advised that the patient be kept under close observation and the pregnancy allowed to continue. As the family physician was to be away some months, definite directions were given to the patient to report to a specified physician at short intervals. Instead,

CASE NO. 604.

Date.	Vol.	Specific Gravity.	Reaction.	Albumen.	Diacetic Acid.	Ammonia.	Total Sugar in Urine, Grams.	Carbohydrate in Diet, Grams.
1913								
Aug. 26.....	2000	1040	Acid	0	sl. 0		76	
Sept. 2.....	—	1023	"	s. p. tr.	+++		0.4%	
5.....	1750	1029	"	s. p. tr.	++	2.4	14	
9.....	1500	1011	"	0	+		0	
12.....	—	1029	"	sl. tr.	++		0.1%	60
16.....	1250	1023	"	sl. tr.	0		0	80
20.....	—	1023	"	Esb. 0.05%	0		0	
23.....	1500	1020	"	" 0.1%	0		0	65
26.....	Single Spec.	1023	"	" 0.3%	sl. +		0	
27.....	1000	1022	"	" 0.4%	0		1	

the patient did not report. June 10, and June 18, the urine, which was examined by the physician and his assistant who were to take immediate charge of the case, was found sugar-free. The husband, however, took another specimen to an osteopath, who said that he found sugar, and for weeks the patient was placed under his observation. Upon the return of the original family physician in August, during the sixth month of pregnancy, 3.8% of sugar was found and a slight trace of diacetic acid, and soon albumen developed. In the seventh month, September 27, on account of urgent symptoms, the pregnancy was terminated, the patient dying a few hours later in coma—probably uremic—and the baby was lost. Ether was used. Shortly after the husband committed suicide on her grave, but it is only fair to record that a previous attempt some years before with chloroform failed. The accompanying chart shows the later course of the disease.

CASE NO. 854, age 33, first seen April 15, 1915. The onset of diabetes was in 1911, and sugar was discovered in December of that year. An uncle died of diabetes, father of cardiac disease, mother of paralysis, two brothers and one sister well, six brothers and sisters of diphtheria, one sister of appendicitis. In August, 1912, the patient was delivered of a child, now well. On December 13, 1914, she had a stillborn child at term, but had a hard confinement.

The patient said she was sugar-free during the first month of pregnancy, in April, 1914. In April, 1915, three examinations of the urine were made by me, and showed sugar varying between 0.4 and 0.6%. The specific gravity varied between 1013 and 1017, the slightest possible trace of albumen was present, and no diacetic acid. Evidently the case was mild in type throughout. A partial explanation of this was that the patient's highest weight was 173. It had fallen to 149 in April, 1914. Physical examination showed normal reflexes, no acetone odor, teeth normal, pulse 112, blood pressure 130, a systolic murmur at the apex of the heart, lungs normal and nothing abnormal felt in abdomen.

The remaining seven cases represent a milder type of diabetes. Too much sugar, however, was present in the urine to allow one to consider them simply transitory glycosurias, and furthermore, in two of the cases sugar was demonstrated before pregnancy occurred. It is not strange that four of the cases occurred in physicians' families.

CASE NO. 256, age 27, first seen May 29, 1909. Family history negative. Measles, scarlet fever, pos-

sible chorea and considerable anaemia at 23. Jaundice at 24. Married at 25. One healthy child. The second pregnancy began in November, 1908, but sugar was not discovered until May 26, when the patient had an attack of vertigo with black spots before the eyes, lasting for ten minutes. The urine then showed specific gravity 1038, acid, no albumen, sugar present. The diet was promptly changed, and when I first saw the patient on May 28, two days later, the 24 hour urine was 1420 c.c., specific gravity 1027, slightest possible trace of albumen, no diacetic acid, and 0.8% of sugar, or 11 grams in the 24 hours. The sediment showed no pus, casts or blood. The diet of the patient was gradually changed from one containing 160 grams of carbohydrate to one containing about 125 grams, at which it remained until after confinement. Sugar was constantly present until confinement on August 20, when the patient was successfully delivered of a boy. September 18, the sugar had disappeared, and from that time on remained absent and has continued so until the present time. A third pregnancy occurred one year later.

The physical examination of June 7, 1909, showed nothing abnormal. The weight of the patient before marriage was 112, and while carrying the first baby was 150; during the sixth month of the second pregnancy it was 140. The high specific gravity in May, —1038—shows that the per cent. of sugar at this time also must have been high, and it is fair to infer that if this patient had not been promptly treated the disease might have taken a serious turn. As it is, one likes to believe that it illustrates the efficacy of prompt, early treatment.

CASE NO. 732 showed sugar in the urine during the sixth month of pregnancy on September 3, 1903. Diacetic acid was absent. Sugar was again found on September 5, and amounted to 0.1%. On September 20 and October 5 it was 0.5% by the fermentation test. It was 0.4% on November 9, and 0.7% on December 4. At no time did diacetic acid appear, and albumen did not exceed an extremely slight trace. The delivery, on December 26, 1903, was uneventful, and on October 24, 1904, the urine was free from sugar, as it also was on February 16, 1906, and March 19, 1906. Patient and child are well today, but no subsequent pregnancy has occurred.

CASE NO. 712, first seen March 19, 1914. The mother and sister died of apoplexy; father, 3 brothers and 7 sisters and one child 7 years old are well. Past history: Muscular rheumatism and mumps. Pregnancy began October 27, 1913. Sugar was first

CASE NO. 712.

(The urine was acid throughout and the albumen never exceeded a very slight trace.)

Date.	Diabetic Acid.	%	SUGAR. Total Grams.	Carbohydrate in Diet. Grams.	Weight. Lbs.
1914					
March 9.....	—	1.5	18		120½
19.....	0	0.5	9		
26.....	sl. +	0.8	7		
April 2.....	0	0.8	12		121½
9.....	0	1.0	9		122
18.....	0	2.6	21		125
23.....	+	1.6	12		125½
May 1.....	+	0.6	8	120	
8.....	+	0.6	11	75	
16.....	0	0.8	8	110	
23.....	0	1.6	15	115	
June 5.....	0	1.0	10		125¼
11.....	0	1.0	6		
19.....	0	0.6	7		
25.....	0	0.2	2		
July 3.....	0	0.2	2		
11.....	0	0.2	2	125-150	
18.....	0	tr.	0		
Aug. 31.....	0	0.0	0		
Oct. 13.....	0	0.0	0		
Nov. 25.....	0	0.0	0		
1915			0		
Jan. 15.....	0	tr.	0		
March 9.....	0	tr.	0		
April 22.....	0	tr.	0		

discovered March 9, 1914, and there was no evidence that it had been present for a long time. The urine showed 1200 c.c., specific gravity 1030, no albumen, sugar 1.5%, no acetone, no casts, an occasional red blood corpuscle. The urine had not been examined since the previous confinement 7 years before, when it was normal. Subsequent examinations are given on the following chart. Present illness: The patient complained of no symptoms save those of pregnancy. Physical examination: Highest weight 128, usual weight 125, and weight on March 19, 1914, 120. Patient rather thin, and somewhat excited. Pupils equal and react, no acetone odor, teeth normal, knee jerks normal, pulse 112, blood pressure 130, apex of the heart in mammillary line with systolic murmur at base and apex, liver extending a finger's breadth below the costal margin.

The diet of the patient was restricted to between 100 and 125 grams of carbohydrate. She was successfully confined at term. Examinations of the urine were made in August, October and November of 1914, and January, March and April of 1915, but at no time had sugar returned in quantitative amount.

CASE No. 698, age 36, became pregnant in June, 1913. Father, mother and 2 brothers are well. Past history showed appendicitis at 18, ill for 5 months. One child well. In 1905 marked gastric hyperacidity, but there was no sugar in a 24-hour specimen of urine. The patient, however, was said to have shown sugar in the urine on various occasions in 1911. On December 4, 1913, the urine showed specific gravity 1018, acid, no albumen, no diacetic acid and no sugar. On January 14, examination showed 0.6% of sugar. Subsequent analyses are recorded on the chart. The patient went to term and was successfully confined.

This case and the next one to be reported are interesting in that sugar was demonstrated in the urine before pregnancy commenced, and yet the course of the pregnancy was uneventful and the diabetes did not increase in severity. What would have happened had the diet not been restricted is problematical. Like former patients, this patient was kept on a diet containing approximately 125 grams of carbohydrate.

CASE NO. 698.

Date.	Volume.	C. C.	Specific Gravity.	Albumen.	Diabetic Acid.	%	SUGAR. Grams.
1905							
Jan. 17.....	950		1031			0.0	0
1913							
Dec. 4.....			1018	0	0	0.0	0
1914							
Jan. 14.....			1031	0	0	0.6	?
30.....	1020		1027	s. p. tr.	0	0.6	6
Feb. 7.....	990		1023	s. p. tr.	0	1.0	9
16.....	900		1030	v. sl. tr.	sl. +	0.4	4
24.....	600		1027	v. sl. tr.	0	0.6	4
Mar. 3.....	420		1031	trace	sl. +	0.4	2
14.....	900		1022	s. p. t.	sl. +	0.0	0
20.....	900		1026	sl. tr.	0	0.0	0
26.....			1026	v. sl. tr.	0	0.2	?
31.....			1036	sl. tr.	0	0.0	0

CASE No. 318, age 27, first seen February 24, 1910. Past history negative. In March, 1908, while teaching school and nervously tired out, sugar was found in the urine. At this time the patient was taking much carbohydrate at night before retiring with the hope of gaining weight; she was previously unaccustomed to sweets. After six to seven months upon a diabetic diet the sugar disappeared. She was married in February, 1909. At the time of the first visit she was not pregnant, but the urine contained 0.4% of sugar. The full analysis was as follows: 520 c.c., specific gravity 1028, acid, very slight trace albumen, 0.4% sugar, no diacetic acid; in the sediment no casts or pus, rare normal blood cell. The patient eventually became pregnant, but sugar was absent throughout, although it returned 2 weeks after confinement in considerable quantity, and up to 1912, the last record amounting to 0.2%. She has since had another child and sugar returned during pregnancy, but disappeared following confinement. She keeps sugar-free, but her physician is closely following her diet.

CASE No. 438, age 25, is sharply in contrast to the one just reported, for instead of sugar disappearing during the pregnancy, it appeared during three successive pregnancies, and was absent in the intervals. I am indebted to Dr. Franklin S. Newell for some of the data. Sugar appeared in the first pregnancy, but ceased immediately after confinement. In the summer of 1910 it occurred, but a miscarriage took place. The urinary analysis of August 29, 1911, showed acid reaction, specific gravity 1019, slightest possible trace of albumen, sugar 0.6%, no diacetic acid; the urine of September 14, 1911, showed 2000 c.c., acid, specific gravity 1020, slightest possible trace of albumen, sugar 1.0%, no diacetic acid. The nitrogen was 12.6 grams, no casts, pus or blood. In March, 1913, the patient considered herself pregnant, but the urine at that time and at subsequent examinations soon after failed to show sugar, and time showed that pregnancy did not exist! Pregnancy did occur in December, 1913, and a trace of sugar showed throughout, only to disappear after confinement in September, 1914.

Thus at three pregnancies sugar has been present, but in the intervals sugar has been absent. The absence of sugar at a time when the patient considered herself pregnant but was mistaken is also interesting.

Foster (Nellis B. Foster, *Diabetes Mellitus*, 1915, p. 99) records a case similar to the above, in which "there had been a pronounced glycosuria during two pregnancies which had entirely subsided after the birth of each child so that there was no sugar in the urine and no dietetic restriction was employed. During the third pregnancy there was observed not only glycosuria, but also a moderate increase of thirst, and following the termination of this pregnancy the sugar secretion and the symptoms persisted."

CASE No. 788, age 35, first seen November 9, 1914. Father had diabetes, but at the age of 73 is considered well. Mother died of diabetes and heart disease. Two brothers are well, but a sister has malignant disease and sugar is also present in the urine. Another sister is well. Past history: Patient

has eaten a considerable quantity of sweet food. A mild pneumonia at 32; bronchitis and tonsillitis several times. During the first pregnancy, at the age of 33, she showed traces of sugar at eight and one-half months, even though she dieted for diabetes. On account of threatened symptoms delivery was brought about at eight and one-half months, but the baby lived only 24 hours. Following confinement mental symptoms developed, and the patient was at a sanatorium for nearly two months. At the end of this time the urine was free from sugar.

The patient again became pregnant in September, 1914. On November 9, 1914, the urine showed 0.4% of sugar, no diacetic acid, slightest possible trace of albumen, no pus, casts or blood. A trace of sugar was present two days later. The general appearance of the patient was excellent; pupils and knee jerks normal, pulse 92 and regular, blood pressure varying from 130 to 135, and at a second examination was 145. The area of the heart was normal, but there was a systolic murmur at the base and apex. Otherwise the physical examination was negative. On account of the severe mental symptoms at the first pregnancy, the persistent glycosuria, the elevated blood pressure and the marked hereditary tendency, it was considered best to terminate the pregnancy, which was done on November 17, 1914. Sugar was absent from the urine on February 3 and on April 10, 1915.

Out of the seven cases of moderate or severe diabetes associated with pregnancy, it is true that four are dead,—one by suicide (Case No. 671), one (Case No. 604) with uremic manifestations which can reasonably be ascribed to neglect, a third (Case No. 608) died in coma, pregnancy having developed after diabetes had existed for a year, but treatment of which was neglected, the patient later being under the care of a clairvoyant, and the fourth (Case No. 106) in which the patient successfully went through her first pregnancy in 1897 with a healthy child, but again was confined and the child lost in 1905, the patient dying two months later of pulmonary tuberculosis. But it is also true that of the three remaining cases one is in exceptionally good health, free from sugar, and has a normal child six months after delivery; that another is in a tolerable condition, having been pregnant three times but with only one child now living; and that the remaining case (Case No. 307) is alive, although severely ill with diabetes six years after confinement.

All of the seven cases with moderate quantities of sugar in the urine are well.

On the other hand, it must be remembered that of the seven severe cases only one, Case No. 812, occurred at a time during which modern treatment could be carried out. It is a fair inference to draw from the other cases that pregnancy in this instance would not have progressed so favorably had the disease developed when knowledge of treatment was less advanced. A study of this case makes it also a fair inference that Cases Nos. 608 and 604, under careful treatment, would not have terminated fatally. I do not think that Case No. 621 would have

been successful under any condition, because of the mental state of the patient. Of the four cases which died, three were known to have sugar in the urine before pregnancy took place, but I personally do not believe that this fact had much to do with the unfavorable course of the disease, although I would agree to the statement that pregnancy occurring in diabetes is far more serious than diabetes occurring in pregnancy. It must be acknowledged, however, that the diabetes appeared in Case No. 106 after pregnancy began, as well as in the other three severe cases which survived, and that Case No. 106 lived eight years after her first pregnancy.

It is important to note that the seven milder cases presented quantities of sugar which were considerable in amount; that four of these cases were in medical families and so the disease presumably was discovered early, and that the favorable course of the disease with them can justly be explained by their constant supervision. Of these seven cases, two showed sugar before pregnancy, but this apparently did not exert an unfavorable influence.

The favorable outcome of Case No. 812 encourages one to believe that even if a patient had a somewhat severer type of diabetes, it could be successfully combated. Several expedients which could have been tried were not necessary. For example, fasting was not employed; at confinement instead of ether, gas and oxygen could have been used, or the Caesarean section could have been performed with local anesthesia; and furthermore, the patient need not have gone to full term.

CONCLUSIONS.

From a study of these cases it would seem that the secret of success in the treatment of pregnant women with sugar in the urine is:

1. To have the patients under constant supervision throughout the course of the pregnancy and for some months after confinement. The cause of the death of Case No. 604 may well be attributed to the neglect of this precaution.
2. Treatment should follow exactly the same methods which are employed in the treatment of the usual case of diabetes.
3. Even when sugar appears to a slight extent in pregnant women, it should be carefully watched and controlled by diet.
4. The advantages of a Caesarean section should be borne in mind.
5. Whereas ether anesthesia may work well, it is probably not so safe as gas and oxygen. If ether should be used, as brief an anesthesia and as little ether as possible should be employed.
6. Finally, many statements occurring in the literature of pregnancy and diabetes must be revised. Pregnancy in diabetes does not demand immediate abortion, even if acidosis is present. If pregnant diabetic cases are suitably managed, they will very likely abort less frequently. It cannot yet be accepted as proven that pregnancy

aggravates a diabetes. It is quite possible that the reason for a patient with diabetes becoming worse during pregnancy is simply due to the ingestion of an unusual quantity of food. Reliable data upon the carbohydrate tolerance of diabetic patients before and after pregnancy are not available, although Maase (*Char. Ann.*, Vol. 35, p. 33) records a single such instance. Nursing is not contraindicated following confinement, for the diversion which it affords the patient may offset the extra demands thrown upon the metabolism. Too few data have been accumulated regarding the blood sugar of pregnant women to warrant conclusions. The same statement may be made about the alleged excessive weight of children of diabetic mothers. The next few years may show that pregnancy can take place in diabetic patients far more readily than has been supposed. It is certainly true that with the improvement in the treatment of diabetic patients, diabetic women will be less likely to avoid pregnancy.

SURGICAL SPECIALTIES IN HOSPITALS.*

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THE enormous advances which surgery has made during the last half century have made it inevitable that many men should interest themselves in some special branch or branches of surgical work, to the exclusion of others. This narrowing of one's field of activity is not to be condemned, provided it has taken place through a natural process of selection and has been based upon a proper knowledge and experience of the whole surgical field. The so-called specialties have not only made distinct places for themselves, but at the present time apparently are making these places more secure both in the minds of the profession and of the general public. Whether such specialties have sufficient reason for their existence, or whether they exist for the best interests of surgery and the surgical profession is not for our discussion here. They do exist and flourish. Let us consider them in their surgical relations, both from the hospital and from the medical school point of view.

A hospital is commonly said to have three great fields of usefulness,—the efficient cure of the sick; the proper use of its material for advancing the cause of science; and the teaching of doctors, students and nurses. For the efficient cure of the sick in any but small hospitals there must be some basis for a division of cases into groups, as one service of men and nurses cannot properly care for more than a certain number of cases—50 or 60. In making such divisions it would seem obvious that if the cases are grouped according to their kind, those caring for them, both doctors and nurses,

* From the *Harvard Medical Bulletin*, page 21, May, 1915.

will acquire an excellence of technical routine which will be both economical and efficient, and thus will be of the greatest advantage to both the hospital and the patient. This is so evident, that in many of the hospitals where such special departments of work are more or less frowned upon, the conditions arrange themselves to some extent automatically, and one finds a certain sort of patient being admitted to Dr. So-and-So's service because he is known to be especially interested and expert in the care of that sort of case, and is anxious to give all the time and skill he possesses to the study of it. So that from the patient's point of view it would seem as though such special departments are necessary in every hospital. The same may be said with relation to research work and other scientific use of surgical material. The special worker will evidently take more interest in the best and completest use of his material and will get the best results for his profession and for himself from such study.

Again, it seems to be the common opinion to-day that every good hospital should be a teaching hospital, and therefore that its organization must be based in some degree upon medical school needs. In the school, as in the hospital, the wide range of subject matter, to be properly administered, demands division of material; and in the school, much more than in the hospital, up to the present time, this division into departments pertains, because it has proved the obviously best solution of the teaching problem. But for the school's best interest, this same division into departments should maintain to a corresponding degree in the hospital because the best teaching demands such groupings of patients, just as the best hospital efficiency and economy demand it. So that theoretically it would seem to be at once for the best interest of patient, hospital and medical school that special services shall exist.

All very well, but where is this theory leading us? How far shall we go with it? Is the general surgeon to disappear? Are we to have specialists in all branches of surgery? Are hospital house-officers and nurses to be brought up as specialists from the start, with a practical hospital education in one line of work only? Are the members of our visiting staffs to be confined to a small field of work, or at all events to a much smaller field than meets with their inclinations and desires? Are the orthopedic men, the aurists, and the urologists, to be followed by many other special men, each lopping off a portion of the work formerly performed by the general surgeon? Obviously not, although it would seem almost as though this were so at the present moment. It is a hard problem and probably it is one which will gradually develop and settle itself, without much guiding from the profession. It would seem, in spite of all our theorizing about specialties in surgery, that the general surgical service must exist for many years to come and that the development of various spe-

cial departments in surgery must be a problem for the individual hospital concerned, both from its hospital and from its medical school aspects.

At the Boston City Hospital, where for many years special departments in surgery have been in little favor, an interesting experiment is being tried on lines suggested by Dr. George H. Monks. There had never been a genito-urinary service at the hospital. He suggested that such a service be organized, somewhat as follows: Every other genito-urinary case, male or female, is admitted to the 4th surgical service of twenty beds devoted exclusively to the care of urological cases. This leaves the other half of such cases to be distributed among the three other surgical services, so that these may not be deprived entirely of their genito-urinary cases. It is hoped that the development of the special service will attract enough extra patients of this sort to the hospital so that the special service will grow in size and in the quality of its cases, while at the same time the other services will maintain as many such cases as they had before. The service, so far as its visiting staff is concerned, is on a par with the other surgical services, and all members of the staff, in order of their seniority, are privileged to choose months of work on this, as well as on the other services; so that the men most interested in urological work may choose this service, and yet others less interested may also choose occasional work on this service if they so desire and in order of their seniority. The house-staff of two is appointed for six months—three months junior and three months house-surgeon. This short service is arranged with the hope of attracting superior men of previous surgical training, who desire experience in this special line of work and yet who feel that they cannot devote longer periods of time to it. So far this hope has been justified. The special service has general supervision, but not complete control of the urological room in the out-patient department, so that out-patient surgeons, in the order of their seniority, may choose months of work in this room if they desire, just as they have done always. This results, as in the service in the house, that the men most interested in and identified with urological work will naturally choose this out-patient service, so far as their rank entitles them to do so.

It will be seen at once, that while such an organization does not create an ideal special service, it does provide the hospital with an adequate urological service, from both the patient's and the hospital's point of view, and it does make a teaching unit which can utilize its material adequately for medical school purposes. It does this without conflict with other surgical services and it deprives no one on the staff of material which he desires to retain for his own purposes. This urological service has passed its first year of existence and it is steadily progressing in interest and value. May it not very possibly be the forerunner of similar services for other branches of surgical work?

OBSERVATIONS UPON THE ETIOLOGY AND TREATMENT OF HEART DISEASE.*

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THE relationship of the more important abnormalities of the heart beat to etiology and treatment has been studied in the cardiac patients seen at the Massachusetts General Hospital during the year August 1, 1914, to August 1, 1915.

Auricular fibrillation produces the most important disorder of cardiac rhythm—absolute irregularity, perpetual arrhythmia, or *delirium cordis*. It consists of an absolutely irregular ventricular response to a fibrillary activity of the auricular walls in the place of normal regular ventricular response following auricular contraction. It is indicative of a damaged myocardium. One hundred cases of auricular fibrillation were found in the wards and in the outpatient department of the hospital during the year.

Pulsus alternans, consisting of the alternation of strong and weak pulse beats either with normal rhythm or after premature beats, is the most important pulse index of myocardial exhaustion, much more significant than the *delirium cordis* of auricular fibrillation. One hundred patients with alternation of the pulse, with rates nearly all below one hundred per minute and none above 125, were seen in the wards and outpatient department of the hospital during the course of the year.

The present communication is chiefly concerned with the comparison, with regard to etiological factors; of these two series of cases with each other and with one hundred consecutive cases with heart disease and normal cardiac mechanism, i.e. normal rhythm without alternation, over the age of ten years seen at the hospital during the same year. I shall also discuss the etiology in seventeen cases of heart block of high grade made up of four cases of complete block, two of which had also lesions of the right branch of the bundle of His (as shown by electrocardiograms) and thirteen other patients with bundle

branch block. Of these thirteen cases three had also auricular fibrillation and seven had alternation of the pulse. Finally there will be considered seven cases of auricular flutter, which is an uncommon type of very rapid and abnormal auricular action with which heart block usually of the two-to-one grade is associated. Premature contractions (the *extrasystoles* of old) and paroxysmal tachycardia I shall not consider here partly because of their relative unimportance and partly because hospital statistics in such conditions are incomplete and hence misleading.

The present series of cases of alternation of the pulse is the largest which has been studied statistically; for comparison I have summarized the cases recorded by Gravier,³ 38 of his own and 50 collected from the literature. The fibrillation cases are numerous enough to compare satisfactorily with Lewis' 152 patients as tabulated in the second edition of his "Clinical Disorders of the Heart Beat"; the patients with auricular flutter add appreciably to the 53 cases collected by Ritchie¹² from his own clinic and from the literature; and finally the instances of heart block of the bundle branch type (14 with right branch involvement and 1 with left) may be studied with reference to the series of 22 discussed by Carter.² A general comparison may be made as to etiological type with the six hundred patients recently analyzed by Cabot.¹

Sex and age. Tables 1 and 2 show the sex and ages of the patients of the present series and also of the cases recorded by Gravier,³ Lewis,³ Carter,² and Ritchie¹² for comparison.

TABLE I. SEX.

	Male	Female
Cardiac patients with normal mechanism	66	34
Patients with auricular fibrillation	56	44
Patients with alternation of the pulse	68	32
Patients with heart block	14 (82%)	3 (18%)
Patients with auricular flutter	5 (71%)	2 (29%)
Gravier's alternation series (88 cases)	64%	36%
Lewis' auricular fibrillation series	60%	40%
Lewis' heart block series (42 cases)	79%	21%
Carter's heart block series	86%	14%
Ritchie's flutter series	84%	16%

TABLE II. AGE.

	0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90
Cases with normal mechanism	—	15	27	12	26	11	7	2	0
Auricular fibrillation	0	0	5	17	22	27	19	9	1
Alternation of pulse	0	4	3	10	23	25	21	13	1
Heart block	0	0	0	1	2	5	4	5	0
Auricular flutter	0	0	0	3	4	0	0	0	0
Gravier's alternation points (88 cases)	0	3	4	15	16	21	22	4	0
Lewis' auricular fibrillation cases	0	7	26	23	29	27	23	4	5
Lewis' heart block cases	0	7	7	5	8	3	6	5	1
Carter's heart block cases	0	2	3	5	4	2	6	0	0
Ritchie's flutter cases	2	4	3	5	8	13	12	2	1

* Read at the Heart Symposium of the Mississippi Valley Medical Association, Lexington, Ky., October 19, 1915.

In every group recorded in Table I, the male sex preponderates, most markedly in the series of heart block and auricular flutter. Cabot,¹ however, in his general analysis of 600 patients with cardiac disease found a very even division between sexes—49% male and 51% female. Also of seventeen children under ten years of age sick with endocarditis in the wards of the hospital during the year, eleven were female and six were male; these children all had normal cardiac rhythm except one, who showed auricular premature beats. From available data we may conclude that auricular fibrillation, auricular flutter, heart block, and *pulsus alternans* are more frequent in the male than in the female.

The age incidence in auricular fibrillation and in alternation of the pulse is strikingly similar, the fifth and sixth decades in each series pre-

(12%), and chloroform in one case (4%). A severe attack of typhoid fever was the only likely factor in one of the two flutter cases of doubtful origin in my own series. Besides producing flutter, diphtheria has been accused of causing heart block and auricular fibrillation.^{2, 4, 7, 9, 10, 11, 12} Scarlet fever was directly responsible for the acute endocarditis found in two of the seventeen children with endocarditis under the age of ten years seen in the wards of the Massachusetts General Hospital during the year.

Arteriosclerosis apparently played a very important rôle in the production of alternation of the pulse in the cases recorded by Windle.¹⁴

Hyperthyroidism was present in the medical wards of the hospital in seventeen patients without alternation or fibrillation as well as in the five cases recorded in the table. The patients

TABLE III. ETIOLOGY.

	Rheumatism							
	Total	Mitral Stenosis	Spillitis	Arterio-sclerosis	Nephritis	Hyperthyroidism	Congenital Heart	Doubtful
Cases with normal mechanism	54	28	21	7	7	—	5	6
Auricular fibrillation	48	22	4	26	5	4	0	13
Alternation of the pulse	15	8	14	32	29	1	0	9
Total per cent. of 300 cases	30%	19%	13%	22%	14%	2%	2%	
Heart block	4	1	1	12	0	0	0	0
Auricular flutter	4	2	0	1	0	0	0	2
Gravier's cases of alternation	14%		11%	10% + 47%				
Lewis' cases of fibrillation	60%	52%						
Lewis' cases of heart block	32%		11%					
Carter's cases of heart block	32%		18%	27%				
Ritchie's cases of auricular flutter (25 cases)	44%		16%		8%	4%		
Cabot's general series	40%		12%	16%	20%			

dominating. The age limits of alternation observed were 10 and 83, of fibrillation 21 and 83. Lewis⁸ in 1913 cited the reported age limits of fibrillation as 5 and 84 years. An analysis of 33 out of 45 cases of *pulsus alternans* found by Windle¹⁴ shows 31 over the age of 50 years. The comparison of the cases of normal heart beat with those of fibrillation and alternation demonstrates clearly what we should expect, namely that the older the patient with heart disease, the less likely he is to have normal mechanism and the more likely he is to have fibrillation or alternation.

Etiological factors. Table III shows the relationship of various etiological factors to the more serious disorders of the heart beat. The rheumatic group includes patients with cardiac damage following chorea, rheumatic fever, or tonsillitis.

It is well known that a close relationship exists between mitral stenosis and auricular fibrillation. In my series of 61 patients with this valve lesion 22 (36%) were fibrillating. Lewis⁸ reports that fibrillation was present in 22 (21%) of 106 out-patient cases of mitral stenosis.

Other causes than those recorded in the table among 25 of Ritchie's flutter series¹² were diphtheria in 2 cases (8%), influenza in 3 cases

showing the abnormal cardiac mechanism were chronic cases.

Excessive use of alcohol, tobacco, coffee, and tea apparently played no direct part in the production of the important disorders of the heart beat; a history of previous indulgence was obtained more often from the patients with normal cardiac mechanism than from those with serious disorders of the heart beat.

Eight of the one hundred cases with auricular fibrillation were of the transient or paroxysmal type. So far as I know none of these eight patients has developed a persistent fibrillation but it is probable that some of them will do so eventually. Of six cases of transitory *delirium cordis* reported by Fox⁴ in 1910, five developed permanent irregularity of the pulse. An acute pericarditis, possibly by direct irritation, accounted for the short paroxysms in one of my eight cases of paroxysmal fibrillation.

Twenty-eight of the three hundred cardiac patients with normal mechanism, auricular fibrillation, and alternation of the pulse were of unknown or doubtful origin. At times difficulty was experienced in placing the cases into groups of the various types, i.e. rheumatic, luetic, and so on, but reasonable accuracy was assured by

utilizing all data obtainable: past history, physical examination, urine examination, blood pressure estimation, the phenolsulphonephthalein test, the Wassermann reaction, eye ground examination, and the use of the Roentgen ray.

Observations upon treatment. Table IV shows the number of cases with physical signs of cardiac insufficiency among the three hundred patients with normal heart beat, auricular fibrillation, and alternation of the pulse. Also there are indicated the number of patients subjected to digitalis, morphine, venesection, and the change of diet to five small meals daily. Rest as complete as possible and the administration of digitalis were the therapeutic measures of prime importance in nearly all of the cases. Digitalis acted most favorably and rapidly in the patients with auricular fibrillation. It was given nearly always in the form of 0.1 gram ($\frac{1}{2}$ grains) pills made directly from the Caesar and Loretz standardized leaf. This preparation proved very effective all through the year, results being obtained in a very few days after beginning its use. There were but two or three patients who were unable to take this preparation. In the urgent cases strophanthin, ouabain, or digipuratum were used intravenously—in thirty-five patients in all: twenty-four with auricular fibrillation, ten with alternation of the pulse, and one with normal cardiac mechanism.

Morphine was used in patients who were decidedly uncomfortable—dyspnoeic and restless. Venesection was employed in the presence of marked venous stasis, cyanosis and dyspnoea. In addition to these therapeutic measures special diuretics such as diuretin and theocin and purgatives such as magnesium sulphate and elaterin were used as needed, especially for marked or persistent oedema. The change in diet to five small meals a day was frequently a useful adjunct.

TABLE IV.

	Physical signs of cardiac insufficiency.	Digitalis	Morphine	Venesection	Five small meals daily
Cases with normal mechanism	35	25	20	4	11
Auricular fibrillation	66	64	25	3	11
Alternation of the pulse	50	44	22	4	12
Total	151	133	67	11	34
Per cent. of 300 cases	50%				
Per cent. of 151 cases	88%	44%	7%	23%	

SUMMARY.

1. The male sex has been found to be more subject to auricular fibrillation, auricular flutter, heart block and alternation of the pulse than has the female sex.

2. The older the patient with heart disease the more subject he has been found to be to serious abnormalities of the heart beat.

3. Auricular fibrillation and alternation of the pulse occurred at the same ages, most frequently in the fifth and sixth decades.

4. Rheumatic hearts usually showed normal mechanism or auricular fibrillation, much less commonly *pulsus alternans*.

5. A considerable percentage (36%) of syphilitic hearts showed alternation of the pulse; few were fibrillating.

6. A patient with cardiac insufficiency in the course of cardiorenal disease was very apt to show *pulsus alternans*, either constant or more frequently only after ventricular premature beats.

7. Cardiosclerosis often resulted in the production of fibrillation and alternation.

8. Hyperthyroidism of long standing was sometimes attended by auricular fibrillation.

9. Alcohol, tobacco, tea, and coffee appeared to play no direct part in the production of serious disorders of the heart beat.

10. Two-thirds of the patients with auricular fibrillation, one-half of those with alternation of the pulse, and one-third of those with normal mechanism in the present series showed physical signs of cardiac insufficiency.

11. Digitalis was used in 88% of these decompensated cases, almost always in the form of pills of standardized leaves. Intravenous medication was used in urgent cases only.

12. Morphia was given beneficially in nearly one-half of the patients with physical signs of insufficiency, often one dose sufficing to give the patient the first comfortable night in weeks.

13. Venesection was found useful in a few urgent cases.

14. The change in diet to five small meals daily was often much appreciated by the patient.

REFERENCES.

- * Cabot, E. C.: Jour. Am. Med. Assn., 1914, lxiii, 1461.
- * Carter, E. P.: Arch. Int. Med., 1914, xiii, 803.
- * Fleming, G. B., and Kennedy, A. M.: Heart, 1910-11, ii, 77.
- * Fox, G. H.: Am. Jour. Med. Sci., 1910, cxi, 815.
- * Gravier, L.: L'Alternance du Cœur; Étude Critique et Clinique, Paris, 1914.
- * Hecht: Ergbn. der inner. Med. u. Kinderheilk., 1915, xi, 324.
- * Hume, W. E.: Heart, 1913-14, v, 25.
- * Lewis, Th.: Clinical Disorders of the Heart Beat, 2d edition, London, 1912.
- * Magnus-Alshöben: Zechr. f. Klin. Med., 1910, lxi, 82.
- * Parkinson, J.: Heart, 1915, vi, 12.
- * Price, F. W., and Mackenzie, I.: Heart, 1911-12, iii, 323.
- * Ritchie, W. T.: Auricular Flutter, Edinburgh and London, 1914.
- * Röhmner: Verhandl. der Gesellsch. f. Kinderheilk., 1911, xxviii, 372.
- * Windle, J. D.: Quart. Jour. Med., 1913, vi, 453.

Book Reviews.

S. Weir Mitchell, M.D., LL.D., F.R.S. 1829-1914. Philadelphia. 1914.

This privately printed volume consists of the memorial addresses and resolutions presented at

the special meeting of the College of Physicians of Philadelphia, held upon the death of Dr. S. Weir Mitchell, January 6, 1914. Besides the record of this meeting, it contains four minutes passed, upon this occasion, by the trustees and medical council of the University of Pennsylvania, the directors of the Library Company of Philadelphia and the trustees of the Jefferson Medical College. It also contains the record of a joint meeting in memory of Dr. Mitchell, held on March 31, 1914, by the College of Physicians of Philadelphia, the American Philosophic Society, the University of Pennsylvania, the Library Company of Philadelphia, the Jefferson Medical College and the Academy of Natural Sciences. Dr. James C. Wilson, president of the College of Physicians, presided at this meeting and addresses were delivered by Mr. Talcott Williams on Dr. Mitchell as a man; by Dr. William H. Welch on Dr. Mitchell as a physician and a man of science; and by Mr. Owen Wister on Dr. Mitchell as an author. Apart from the individual interest of all these addresses, the volume, as a whole, is of extreme value as a combined record of appreciation of Dr. Mitchell by his colleagues as one of the great physicians and men of letters whom this country has produced. An admirable portrait engraving of Dr. Mitchell forms the frontispiece of the book.

Old London's Spas, Baths and Wells. By SEPTIMUS SUNDERLAND, M. D., London: John Bale, Sons and Danielsson. 1915.

This volume, by the president of the Balneologic and Climatologic Section of the Royal Society of Medicine, is based on his presidential address before that body in November, 1914. This has now been expanded into a history of old London, with reference to its water supply, wells, baths, medicinal springs and spas. To the physician it is of interest not merely as a professional study of water supplies and of hydrotherapy, but as a local medical history of London with many allusions and collateral references to history of a general and non-professional character. It is charmingly illustrated with thirty-six full page plates, representing many scenes in and about London, both of the past and of the present. The text is agreeably written and will appeal immediately to non-professional as well as to medical readers. The volume closes with a valuable alphabetic bibliography of over fifty titles. In its editorial comment on Dr. Sunderland's work, the *Medical Press and Circular* quotes as follows from Thomas Dekker's famous description of London in one of his plays.

"Oh London, Thou art great in Glory and envied in thy greatness. Thy Towers, thy Temples, thy Pinnacles are set about thine Head like a Garland of fine gold. Thy waters hang like fringes of silver upon the borders of thy Garment. Thou art admired like a Bride that drawest all men that look upon Thee to be in

love with Thee.' The waters are now most of them drained into the Thames, and the fringe is almost wholly invisible. Kilburn, Tyburn and other similar names perpetuate its memory, and to the observant eye local fogs still attest the subterranean presence of its components. The subject of these underground rivers is an interesting one; to some it is even absorbing. Perhaps Dr. Sunderland in his inimitable manner will some day tell us about them, too."

It is sincerely to be hoped that the author will comply with this editorial suggestion.

Nursing in Diseases of the Eye, Ear, Nose and Throat. By the Committee on Nurses of the Manhattan Eye, Ear and Throat Hospital. Second edition, thoroughly revised. Philadelphia and London. W. B. Saunders Company. 1915.

The first edition of this text-book by the ophthalmologic, otologic and laryngologic surgeons of the Manhattan Hospital was reviewed in the issue of the *JOURNAL* for Jan. 5, 1911 (Vol. elxiv, p. 26). In this second edition not only has the text been edited with a view to the elimination of obsolete material, but sections have been added on several new subjects, such as the preparation of surgical dressings, mental disturbances after operations on the eye and functional tests of the static labyrinth. This chapter on feeding and care of infants has been especially revised in the light of the latest teaching on this subject. The book is well illustrated with eighty-one text figures and should continue a valuable volume in the series of text-books for nurses issued by this publisher.

Compend of Human Anatomy. Revised by D. GREGG METHENY, M.D., L.R.C.P. and S. Edin.; L.F.P.S., Glas. Eighth edition. Philadelphia: P. Blakiston's Sons and Company.

The original edition of this familiar manual in Blakiston's series of so-called quiz compends was prepared by Dr. Potter. This eighth edition of Potter's work by Dr. Metheny maintains the merits and disadvantages of the original. The danger of such compendia as sole sources of information is one against which students need constantly to be warned; but properly used as a syllabus in conjunction with larger text-books, there is a legitimate field of use for an accurate and well-written work of this sort. The reviser is particularly to be commended for his sensible and conservative stand in the matter of terminology, adopting, as he has done, only those terms from the Basle nomenclature which seem entitled to survival. The book is illustrated with 139 text figures, many tables and sixteen useful plates of the arteries and nerves. With the reservations previously indicated, it may be recommended as a useful aid to students.

Manual of Embryology. By A. MELVILLE PATERSON, M. D., F. R. C. S. London: Henry Frowde and Hodder and Stoughton. 1915.

From time to time the JOURNAL has published reviews of German and American works on embryology. This English textbook on the subject represents the author's lectures and demonstrations as professor of anatomy in the University of Liverpool. The work is divided into two parts, the first dealing with general embryology, the second with organogeny. In his introduction he wisely emphasizes the importance of the study of comparative anatomy and embryology, not only for the understanding of gross anatomy but for the intelligent interpretation of medical and surgical disease. Ontogeny, he points out, "is dependent on, and inextricably bound up with phylogeny." The prime agent in the production of abnormality is excessive or arrested development due to the precocity or subordination of certain of the factors concerned in embryologic evolution. Such abnormalities he differentiates from true teratologic conditions due to pathologic causes. The work is well written and arranged and the judicious use of black faced type facilitates emphasis and study. It is particularly to be commended for the figures, 304 in number, with which the text is illustrated. A few of these are in colors and all are models of clearness and simplicity. The book should find a valuable field as a textbook in this country as well as in Great Britain.

The Work of Our Hands. By HERBERT J. HALL, M. D., and MERTICE M. C. BUCK. New York: Moffat, Yard & Co. 1915.

This volume, published as a study of occupations for invalids, is based on the experience of the authors who, for several years, have devoted special attention to the development of modified work in the treatment of nervous disability and as an aid for the self-support of the blind, crippled and infirm. The book is divided into two parts. The first, by Dr. Hall, represents his work in his sanatorium at Marblehead, Mass., the second, by Miss Buck, deals with her experience in charitable institutions of New York City. Much of Dr. Hall's material has previously appeared in columns of this JOURNAL and of the *Journal of the American Medical Association*. The book is illustrated with eight full page plates. At its conclusion is an appendix in which are tabulated the varieties of occupation employed in the industrial department of the Massachusetts State Colony for the Insane at Gardner. There is also a tabular statement of the agricultural farm products, with appended values, at the several cottages of this institution. The work presents numerous evidences of what may be accomplished with patience and persist-

ence in the use of the work treatment and the value of this treatment is evidenced by the results obtained.

The 'Practitioner's Encyclopedia of Medical Treatment. Edited by W. LANGDON BROWN, M. D., F. R. C. P., and J. KEOGH MURPHY, M. C., F. R. C. S., London: Henry Frowde and Hodder and Stoughton 1915.

This encyclopedic volume, dedicated to Sir William Osler and Sir Clifford Albutt, consists of a series of non-alphabetic monographs by distinguished British experts on various aspects of therapeutics. It is divided into two parts, the first being concerned with methods, the second with agencies in treatment. The subjects are logically arranged, being grouped according to the natural and systemic nosologic categories. In his introduction Sir Clifford Albutt sketches the history and rationale of therapeutics. The volume is well printed but without illustrations. It concludes with an appendix of notable alterations in potency and nomenclature and notable additions of organic chemicals in the British pharmacopeia of 1914. There is an extensive and convenient index.

The Principles of Human Physiology. New (2nd) edition. By ERNEST H. STARLING, M. D., F. R. C. P., F. R. S., Jodrell Professor of Physiology in University College, London. Octavo. pp. 1271. With 566 illustrations, including 10 in colors. New York and Philadelphia: Lea & Febiger. 1915.

The second edition of this excellent work is chiefly noteworthy for its very satisfactory presentation of the energetics of muscular activity. Its discussion of nervous conduction is in accord with the most recent discoveries in that field. In general, such minor changes have been made as are necessary to keep the book abreast of the rapid progress that is now being made in physiology. Unfortunately, in his discussion of the suprarenal bodies and of adrenin, the author has failed to take into account the recent very enlightening observations concerning the emergency function of adrenin. The older point of view, which emphasizes the rise in blood pressure induced by this hormone, places an incidental function so much in the foreground that the truly remarkable significance of the mechanism escapes the student entirely. To be sure, much of this work is so recent that it may not have been possible to include it in this book. The necessity of issuing frequent editions of expensive textbooks is to be regretted but probably cannot be avoided in sciences that are advancing as rapidly as is physiology.

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CHRISTIAN SCIENCE A CHAMPION OF RADICAL SURGERY.

In the last days of the late Mrs. Eddy it was said that she relaxed her earlier principles sufficiently to permit of her followers making use of surgery under certain conditions, as, for instance, "belief in" a broken bone. It was even reported that the founder herself entertained a suspicion of, if not a belief in, toothache, for which she resorted to the dentist instead of trusting solely in God. So that there are said to be at the present time certain "Christian Science dentists," who treat an exposed nerve not alone by the pure Truths of the Spirit but by the addition of cold steel as well.

Still, operative surgery does not seem to be a part of the teachings of "Science and Health," and few of us expected to see the day when the official organ of that cult would take the medical profession to task for lukewarmness in zeal for bloody surgical operations. Yet this

is just what happens in the leading editorial in *The Christian Science Monitor* of November 19, of which marked copies have been sent to many physicians by the management.

The case is that of the too much talked of Chicago monstrosity, which a surgeon simply decided to let alone. A blind, deaf and deformed monster had, in addition, as we understand it, an intestinal occlusion of a nature which in a normal infant would have demanded a surgical operation in hope of removing the obstruction (unless, indeed, "Science" could have promptly stepped into the breach and established normal function).

The question of an active euthanasia was never raised as to this unfortunate child. That is an entirely different issue, regarding which medical men are divided, but as to which the prevalent opinion is still doubtless adverse. A passive or permissive euthanasia seems to have commended itself to the surgeon in charge and also to the mother of the child. Hence the infant was simply let alone, and Nature, which in her inscrutable mystery had sent the child into the world lacking most of its faculties, was allowed through the intestinal obstruction, which was one of the chapters in the pathologic history, to take away the life she had sent.

Yet the *Monitor* says that the doctor "broke the law." "He permitted the baby in this case to die."

Where else in the world can we find such sublime confidence in the omnipotence of the surgical art as in this assumption that an operation, which the doctor is so savagely scored for omitting, would have certainly saved the child's life! Many a medical man has less confidence. Let us quote:—

"The claim of a Chicago doctor to the right to destroy human life for medical reasons brings the whole question of medical autoocracy into the strongest light. . . . So long as any medical man is content with campaigns for pasting red crosses on the shoe toes of children, he is merely humorous. When he goes further and proposes tuberculosis weeks, or takes children down to malaria swamps to fill their minds with the dangers of mosquito poisoning, he becomes dangerous, inasmuch as he instills into the human consciousness a dread of the very disease which he professes later to attempt to eradicate from a body that consciousness has developed. When, however, he claims the right to decide whether a patient is to live or die, he involves himself in what we assume orthodoxy would term blasphemy, the law courts illegality, and the ethical standards criminality. Years ago the legislative bodies of the world took up arms against what

is known as baby farming. Baby farming had become a process for expediting infant mortality, and we see no reason whatever for supposing that the immorality, which found vent for its ingenuity in baby farming, cannot again find room for the same ingenuity in a process of diagnostic removal."

The Chicago surgeon seems to have been guilty in this case at the same time both of withholding the knife and of making a "diagnostic removal," a feat which was to be expected of the ingenuity which caused the medical profession to make that well-known invention of theirs, the baby farm, to expedite infant mortality.

To the order of minds which are tickled with the "humorousness" of Red Cross work, such an expedition as checked the ravages of typhus in Serbia may well appear a frolicsome farce. The "dread" of typhus killed 150,000 Serbians before it was dispelled. Yet malaria and tuberculosis have as little foundation, and not only are all these merely a state of fear, but these people now speak even of the human "body that consciousness has developed."

The former shibboleths seem to stand fast, but what shall we say when told that a surgeon who refuses to operate has done what "orthodoxy would term blasphemy, the law courts illegality and the ethical standards criminality"!

CHARLES F. WITHINGTON.

FOOD-DEFICIENCY DISEASES.

THE study of physiological chemistry and the metabolic processes of the body has focussed a new interest on the part that the individual food elements play in the body processes. Perhaps the condition known the longest to be caused by the deprivation of some food element, with resulting metabolic disturbances characterized with definite symptomology, is scurvy. Even long ago when the nature of the condition was not understood, and the disease very prevalent on ships long away from port or in other places where fresh food supplies were not accessible, it was yet known that the addition to the dietary of fresh food was curative. The disease is now very rare, mainly due to the improvements in transportation wherein ships are not so long away from the possibilities of fresh larder. However, when it does occur, as happened very recently in a sea raider, the disease bobs up with the same character and severity as in years by gone. Fresh vegetables, fresh meat and lime salts and lime juices are the elements

of food that are both curative and prophylactic against scurvy. In bottle-fed babies, scorbutus remains a definite and recognized disease, occurring not infrequently as a result of feeding exclusively with cooked milk, and from the consequent deficiency of citrates in the diet.

The range of food-deficiency includes, beside, rickets, tetany, or allied polyneuritic conditions, beri-beri, pellagra, and perhaps also diabetes.

Rickets is caused mainly by faulty feeding in children. The long administration of boiled milk seems to predispose. The boiling appears to destroy some enzyme necessary in metabolism. Rachitis is further associated with an excess of carbohydrates over proteids in the diet, and is dependent on the consequent deficiency of calcium salts. It is peculiar, however, that the disease does not develop much after two years of age. It is notoriously common where environmental conditions are very bad.

Much study has been expended on the nature of beri-beri because it represents a disease of great prevalence and fatality in the Orient. The one-sidedness in food consumption of those peoples has long been suspected as the causative factor. They subsist almost entirely on rice, and for some reason polish it: that is, they remove the shell. It has been found that where the rice is consumed whole, beri-beri will not develop. In fact, so well is this now established that in the Philippines, under Heiser, a tax of some magnitude has been placed on rice polishings to prevent this. The feeding of rice polishings to those suffering from beri-beri was found to cure them. Or, those subsisting on polished rice, who would add to their diet separately a quantity of rice polishings, would not contract the disease. The element removed with the polishings is believed to be a sulphur compound, and it is this deprivation which causes the nervous symptoms so characteristic of this disease.

Recent investigations by Goldberger* of the Hygienic Laboratory have perhaps fully confirmed the previous well founded suspicion that pellagra is due to a food-deficiency. His experiments on a prison colony of about eighty in which eleven volunteered for the experiment of being fed on a one-sided diet, while the rest acted as controls, are classic. Within five months six out of the eleven developed undoubted cases of pellagra. It is a one-sided diet of cereal carbohydrate that seems to be at the bottom of this condition. A summary of the

* Weekly report United States Public Health Service, Nov. 12, 1915.

experiments by Dr. Goldberger and Dr. Wheeler is published in another column of this issue of the JOURNAL (page 862).

No certainty in food etiology has yet been found in the causation of diabetes, though the trend of present investigation is in that direction.

In nearly all of these cases of food-deficiency it seems that it is the lack of proteins that stands out prominently. The food element lacking in these conditions has been named a vitamin. There are both proteid and carbohydrate vitamins—both necessary for normal metabolism. All of these vitamins are different according as they are of animal or of vegetable extraction. Human beings are omnivorous and need both animal and vegetable food. In any event it is rather the kind of food—the variety and quality—than the quantity which is the determining factor in metabolism. There is much more real starvation in a gluttony with food of one variety than in the ingestion of a minimum quantity of a mixed food. Starvation cannot be induced by minimum quantity as long as there is maximum variety. Indeed, a small quantity of mixed foods is more satisfying to the appetite than a large quantity of a single kind.

CHILD LABOR LEGISLATION.

THE Children's Bureau of the Department of Labor now reports that forty-five states have passed child welfare laws. It will be remembered, however, that Congress itself defeated a bill recently which purposed to control indirectly child labor by prohibiting the passage in interstate commerce of articles manufactured in canneries, mills or factories by children under fourteen years of age. Clearly the abolition of child labor, no matter in what form accomplished, would seem to be most commendable legislation. It is a step in the direction of progress—a step in the conservation of health and life. The confinement necessarily entailed in these industries and the devoting of energies to other purposes than to the child's own physical and mental development, are a handicap that cannot be easily overcome in later years.

Nevertheless, this obstacle to human progress will not be removed by such an evasion of the real issue as is represented by the contemplated federal law, or as was previously proposed by Senator Beveridge of Indiana, who urged that

articles manufactured by children shall not be considered as legitimate articles of commerce, and thus their transportation prohibited. Clearly the remedy lies either in the uncertain method of having each state make its own varied restrictions of child labor, or in so enlarging the legitimate health powers of the federal government that it can directly control this palpable menace to health. It is during the most rapid growth and development of childhood that the very slightest obstruction tends to permanent disorganization of these processes.

In the same class with child labor legislation, and bearing on it indirectly in respect to child welfare, is legislation controlling the hours of labor and the kind of labor of women. The federal court upheld the right of the state to regulate the hours of labor in certain occupations when it laid down the rule that "the right to regulate or control persons in any trade or occupation that affects the health of the people in general is no longer an open question." Yet it demurred at making special exemptions in favor of women and against woman labor. Labor of the kind prohibited in the child labor legislation cannot fail to have a bad effect on the actual or the potential mother, on her offspring, and in this way on the people in general. Indeed, in the investigation by David Heron of the Yorkshire, England, woolen mills, he found that mothers' labor had a worse effect on the child and on the community than child labor. For, prior to the prohibitive legislation against child labor, the families were large—the children were assets who were well looked after; and since this legislation, prenatal destruction of child life is common, because childbearing is a drawback to efficiency; and children born show the ill effects of maternal pressure and fatigue. Obviously there is little or no choice between these two evils. The remedy lies only in legislation hand in hand for both conditions.

SWIMMING-POOL SANITATION.

WITH the growth in popularity of swimming as an amusement and with its increasing appreciation as an aid to health and safety there comes the danger of the dissemination of disease through the medium of the municipal swimming pool. At present in this country 99 large cities have public swimming pools, and how many more cities and towns have something of the kind we

have no means of knowing. Care of these pools naturally varies from the most scrupulous to the most indifferent. Even among those where the method of care is intended to be the best possible the ideas of effectual sanitation vary so much that it does not seem probable that they can all be correct.

With the purpose of ascertaining what methods were in current use, Dr. Manheimer recently investigated forty-six municipal and other pools in large cities and published his results.* He describes the methods of cleansing used in six different pools as typical of all. The methods in use were, broadly speaking, mechanical, chemical, by refiltration, or by combinations of two or more of these methods. The best method of all he states to be refiltration plus chemical purification, the preferred chemical to use being chloride of lime in the proportion of one of chloride to one million of water. He especially emphasizes that pools should be large enough, frequently diluted, carefully supervised and often refiltered.

The principal diseases spread by means of the community swimming pool are venereal diseases and typhoid fever. It may be easily understood theoretically how syphilis and gonorrhea can be distributed by such a medium as the public bath, but typhoid fever does not at first glance seem such a probable menace. The studies of Rosenau, Lumsden and Kastle have shown that three-tenths per cent. of people are typhoid carriers. That is, in a city the size of New York there must be about 15,000 typhoid carriers. Or, to present it in another way, supposing that we have a swimming pool which about 300 persons use each day, the probability is that one of these bathers is a typhoid carrier. These facts alone, aside from the esthetic satisfaction which must accompany the use of a swimming pool which is known to be kept clean, are sufficient to impress upon the physician who has the health of the community at heart the necessity of the most approved methods of sanitation of such places.

* Essentials of Swimming-Pool Sanitation. By Wallace A. Manheimer, Ph.D., U. S. Public Health Reports, Sept. 17, 1915.

THE WORK OF A SPECIAL SURGICAL DEPARTMENT.

IN another column of this week's issue of the JOURNAL we are glad to republish from the Har-

vard Medical Bulletin of May, 1915, a brief article by Dr. Paul Thorndike of Boston, discussing the general subject of surgical specialties in hospitals, particularly as illustrated by the organization and work of the recently organized urological service at the Boston City Hospital. The success which this service has attained during the two years of its existence gives additional interest and importance to the subject and to the writer's comment.

The problem of establishing special surgical services in large general hospitals is always difficult on account of the inevitable and natural feeling on the part of general surgeons that such a procedure takes from them opportunity which is legitimately theirs. At the same time it is imperative that such services should be established on account of the best interests of the patients, of medical education and of those surgeons who are devoting their time and energy to the acquirement of expert skill in special branches of surgery.

The method adopted at the Boston City Hospital for the reconciliation of these conflicting interests and necessities seems largely to have solved this problem. By an equitable division of cases, it secures all the advantages of a special service without infringing on the rights and interests of other members of the hospital staff. In point of fact its success has been particularly marked in the efficiency already developed by the new urological service at that institution. In practice, if not in theory, it would seem that this method might well be adopted, if indeed it has not already been so, in other departments of the City Hospital and in other institutions.

MEDICAL NOTES.

PREVALENCE OF MALARIA, MENINGITIS, PLAGUE, POLIOMYELITIS, SMALLPOX, TYPHOID AND YELLOW FEVERS.—The weekly report of the United States Public Health Service for November 12 states that during the first quarter of 1915, 2359 cases of malaria were reported in Arkansas. During the week ended October 23 there were 35 cases of cerebrospinal meningitis in Elizabeth, N. J., and seven cases of poliomyelitis in Cleveland, Ohio. A fatal case of plague occurred in Hawaii on October 30. During the week ended November 6 four new foci of smallpox infection were reported in Minnesota, the number of cases being few. During the week ended October 23 there were 126 cases of ty-

phoid fever in New York City and 45 in Baltimore. A case of yellow fever arrived at Balboa, Canal Zone, on October 25, aboard the steamship *Jamaica*, from Buena Ventura, Columbia.

HOSPITAL GIFT.—It is announced that Mrs. Isaac L. Rice of New York City has given to the Beth Israel Hospital of New York the sum of \$1,000,000 for the establishment in that city of a hospital, to be known as the Isaac L. Rice Hospital for convalescents. This new hospital is not to be a part of the older institution but will be under the administration of the Beth Israel Hospital Association.

NEW YORK HEALTH DEPARTMENT'S LOW 1915 DEATH RATES.—Dr. Guilfoyl of the New York Department of Health reports that there were 1324 deaths during the past week with a rate of 12.34 per one thousand of population, against that of 1276 deaths in the corresponding week in 1914, an increase in the absolute number of deaths of 48, and an increase in the rate per 1000 of the population of .2 of a point.

The most noteworthy features of the mortality during the week were the decrease in the number of deaths reported from the acute infectious diseases, and the increase in the deaths reported from the diarrheal and respiratory diseases. The mortality from organic heart disease and pulmonary tuberculosis remains approximately the same. The mortality of children under one year of age was considerably above that of last year, the total reaching 232 as against 183, an increase of 49 deaths. Between one and five years of age the mortality was slightly lessened. At the other age groups approximately the same number of deaths were reported.

The death rate for the first 46 weeks of the year 1915, based upon a revised estimate of the population, was 13.59 per one thousand of population as against a rate of 13.75 per one thousand of the corresponding period of 1914, a decrease in the mortality of .16 of a point. If this decrease be maintained during the remaining weeks of the year there will be approximately 885 fewer deaths than in the year 1914.

EUROPEAN WAR NOTES.

CHOLERA IN AUSTRO-HUNGARY AND GERMANY.—During the week ended September 25, 1915, there were among civilians in Germany, two cases of Asiatic cholera each at Thorn, Tilsit and Prettow. Other cases occurred among soldiers in prison camps at Allenstein, Cassel, Marienwerder, Oppeln, Posen and Stettin.

SECOND MEDICAL EXPEDITION TO GERMANY.—On Nov. 25 there sailed from New York City aboard the *Hellig Olav* for Copenhagen, the second medical expedition to Germany under the auspices of the German relief committee of New York. The personnel consists of Dr. Fred Kammerer, Dr. Kurt Sauer, Dr. Frank D. Gorham,

and six nurses. Supplies were carried for a hospital of 400 beds.

AMERICAN SURGEONS IN USKUB.—Report from Saloniki, Greece, on Nov. 17, by way of Paris on Nov. 23, states that at the recent capture of Uskub, Serbia, by the victorious Bulgars, five American Red Cross surgeons remained in that city. They are Dr. Stanley S. Osborne, of Peabody, Mass.; Dr. Charles E. Fox, of Baltimore; Dr. Harry Plotz, of New York; Dr. George Bahr, of Brooklyn; and Dr. A. F. Cornelius, of Berea, Ky. It is understood that negotiations are in progress, through the American and Bulgarian consulates, to secure their release.

WAR RELIEF FUNDS.—On Nov. 27 the totals of the principal New England relief funds for the European War reached the following amounts:

Belgian Fund	\$288,094.04
Red Cross Fund	142,177.51
American Ambulance	70,565.58
Polish Fund	56,258.11
Serbian Fund	50,602.60
Allied Fund	38,453.30
British Fund	38,048.56
French Fund	25,440.66
Armenian Fund	16,939.63
LaFayette Fund	12,382.99
Italian Fund	12,101.69
Surgical Dressings Fund	11,085.50
St. John's Ambulance	392.00

BOSTON AND NEW ENGLAND.

THE WEEK'S DEATH RATE IN BOSTON.—During the week ending Nov. 27 there were 210 deaths reported, with a rate of 15.04 per 1,000 population as compared with 22 and a rate of 16.08 for the corresponding week of last year.

There were 30 deaths under 1 year as compared with 29 last year, and 68 deaths over 60 years of age against 71 last year.

Total deaths reported in 47 weeks from Jan. 2 to Nov. 27 were 10,621 against 10,645 for the corresponding period in 1914.

Deaths under 1 year reported in the same period were 1812 against 1804 for the corresponding period in 1914.

In Boston in 1914 per 1000 births of mothers born in the United States there were 120 deaths under 1 year; while the rate for children of mothers born in Canada was 107; for those of Irish mothers, 101; for those of Italian mothers, 88; and for those of Russian and Polish mothers, 78.

Similar findings for New York City based upon official figures have been published recently. In a word, if a baby wishes to survive it should choose a foreign-born mother.

DEDICATION OF ST. ELIZABETH'S HOSPITAL.—On Sunday, Nov. 21, the new buildings of St. Elizabeth's Hospital, Brighton, were formally dedicated with fitting ceremonies. Although the

hospital was opened on Aug. 31, 1914, the death of Pope Pius X had made it necessary to postpone the dedicatory exercises until the present time. Low mass was celebrated in the chapel, followed by an address by Cardinal O'Connell and an official inspection of the hospital buildings.

A RULING ON INSOLATION. On November 19, the State Industrial Accident Board rendered a decision at Quincy, Mass., that a sunstroke received during the performance of work does not constitute a claim under the Workmen's Compensation act. The ruling was made in a case in which the Board found that the insolation was not caused by anything unusual in the character of the work and that it did not arise out of or in consequence of the employment.

ESTABLISHMENT OF QUIET ZONES.—The subject of quiet zones about hospitals has been discussed in the JOURNAL from time to time in the past. On Monday of last week, November 22, the Boston City Council unanimously passed an ordinance providing for the establishment of such zones in this city. The ordinance requires that automobiles and horse-drawn vehicles shall run slowly and with a minimum of noise within one hundred yards of all hospitals. Venders and other persons are also warned not to make undue noise, and the use of musical instruments is prohibited within these zones.

DANVERS PATHOLOGIC CONFERENCE.—On November 19 there was held at the Danvers State Hospital a conference in commemoration of the twentieth anniversary of the foundation of the pathologic laboratory at that institution, the first laboratory of its sort to be established in a hospital for the insane in Massachusetts. About seventy physicians were in attendance at the conference, and among the guests were Dr. Arthur H. Harrington, superintendent of the Rhode Island State Hospital, and Dr. Charles W. Page. At the afternoon session a series of papers was presented by the following physicians: Dr. Henry M. Adler, Harvard; Dr. James Ayer, Harvard; Dr. Henry A. Cotton of the State Hospital, Trenton, N. J.; Dr. E. E. Southard, Dr. M. M. Canavan, Dr. James J. Putnam, Dr. Page, Dr. Harrington, Dr. Sanger Brown, Dr. S. P. Kramer of Cincinnati, and Dr. L. G. Lowery, pathologist at Danvers.

NEW ENGLAND PEABODY HOME.—The annual meeting of the New England Peabody Home for Crippled and Deformed Children was held in Boston on November 15. Dr. Robert Soutter reported particularly on the value of the sun treatment for surgical tuberculosis. The following staff was appointed for the ensuing year: surgeons, Dr. Robert W. Lovett, Dr. Robert Soutter and Dr. Edwin Fiske; attending physician, Dr. Clarence Bryant; advisory board, Dr. Abner Post and Dr. Edward B. Kellogg.

SOCIAL SERVICE ANNIVERSARY.—The tenth anniversary meeting of the Social Service Department of the Massachusetts General Hospital was held in Boston on Nov. 30 under the presidency of Dr. Richard C. Cabot. The principal address was by Mr. Homer Folks, secretary of the State Charities Aid Association of New York, on "Humanizing the Institution."

MENTAL HYGIENE CONFERENCE.—Dr. A. J. Rosanoff of Kings Park State Hospital, New York, in addressing the Mental Hygiene Conference held recently in this city, stated that 22 per cent. of the male patients admitted to the New York state insane hospitals in 1913 owed their disability to the immoderate use of alcohol. A large number of patients, although predisposed to insanity, probably would have escaped its development had they not been intemperate. Dr. Irwin H. Neff of the Norfolk State Hospital discussed the rational care of inebriates. Dr. Henry P. Frost of the Boston State Hospital discussed the need of assistance and supervision of patients discharged from insane hospitals, and Dr. John B. MacDonald spoke of the usefulness of the newly established out-patient department of the hospital. He reported that during the months of July, August and September, over 1200 persons visited the clinic and 2850 visits were made by the social workers connected with the department to patients on parole under the care of the hospital, and to persons in the community who, of their own volition, sought advice and assistance. Professor W. H. Burnham of Clark University urged a thorough medical and mental inspection of all school children in order that mental and physical defects might be checked and controlled before they become fixed habits.

BOSTON ASSOCIATION FOR THE RELIEF AND CONTROL OF TUBERCULOSIS.—The twelfth annual meeting of the Boston Association for the Relief and Control of Tuberculosis was held in this city on Monday of last week, November 29. Following the regular business there were addresses by Miss Ella Phillips Crandall, R.N., executive secretary National Public Health Nurses' Association, New York City, on "The Tuberculosis Nurse as a Modern Health Agent"; and Miss Eunice H. Dyke, R.N., superintendent of Nurses' Department of Public Health, Toronto, Canada, on "Generalized Nursing in Toronto."

DISTRICT HEALTH OFFICERS.—The State Department of Health has accepted the resignation of Dr. W. H. Coon, of Haverhill, Mass., appointed district health officer, who is to become medical supervisor of a large manufacturing plant. To fill the vacancy, Dr. Lyman A. Jones of North Adams will be transferred from the Berkshire District to Haverhill and a new health officer will be appointed to take charge of the Berkshire District. It is hoped that Dr. Stanley

S. Osborne, a member of the American Red Cross Sanitary Commission of Serbia and now captured by the Bulgarians, may be reached and the appointment given to him.

REPORT OF THE FAULKNER HOSPITAL.—The eleventh annual report of the Faulkner Hospital of Jamaica Plain, Mass., for the year ending May 1, 1915, states that the most notable feature of the work of the hospital has been the growing demand for maternity service. There have been accommodated during the past year forty-nine cases in contrast to nine cases of five years ago, and many have been turned away. The trustees, realizing the urgent need of a separate building in which to care for such cases, have appointed a committee to consider the question of erecting a separate maternity building. The total number of patients treated during the year was 635.

LECTURE BY DR. STRONG.—On Monday of last week, November 22, Dr. Richard P. Strong, professor of tropical medicine in Harvard University, gave an illustrated lecture in Sleeper Hall, Boston, on Serbia and the suppression of typhus fever. This lecture was given for the benefit of the Social Service Department of the Massachusetts General Hospital and described Dr. Strong's experience as chief of the American Red Cross Typhus Commission last summer.

MUNICIPAL HEALTH UNITS.—It is announced that, with the approval of Mayor Curley, Dr. Francis X. Mahoney, Boston Health Commissioner, will establish in the Ward and Municipal Building on Blossom Street, a trial health unit, being a headquarters station for the district health inspectors and nurses. This project has been endorsed by the Boston Instructive District Nursing Association and the Boston Milk and Baby Hygiene Association. If it proves successful, it is planned to establish similar permanent units in other sections of the city.

Massachusetts Medical Society.

PLYMOUTH DISTRICT MEDICAL SOCIETY.—On Tuesday of last week, November 23, the Plymouth District Medical Society held a meeting and dinner at Brockton, Mass., in recognition of the work of five local physicians, each of whom has been engaged in practice for at least fifty years. These five men are Dr. A. Elliot Paine of Brockton, Dr. Calvin Pratt of Bridgewater, Dr. Edward Cowles of Plymouth, Dr. Horatio F. Copeland of Whitman, and Dr. Samuel H. Durgin of Duxbury. All are veterans of the Civil War. The dinner, which was highly successful, was attended by about seventy members of the society.

Obituary.

GEORGE EDWIN PINKHAM, M.D.

DR. GEORGE EDWIN PINKHAM, a retired Fellow of the Massachusetts Medical Society, died at his home in Lowell, November 15, 1915, aged 75 years.

Dr. Pinkham was born in Lowell in 1840. He received his early education at the Dover High School and Franklin Academy, Dover. After pursuing a course of study at the Harvard Medical School, he entered Dartmouth Medical School, and graduated from there with the degree of M.D. In 1862 Dr. Pinkham went to Lowell for the purpose of studying, but at the outbreak of the Civil War he enlisted in the famous Sixth Massachusetts Regiment, and served throughout the war in the capacity of assistant surgeon. When the army was disbanded, Dr. Pinkham returned to Lowell and settled permanently in that city, where he pursued his chosen calling until illness incapacitated him.

He was commandant of Post 185, G.A.R., and was at one time medical director of the first brigade of Massachusetts Volunteers for seven years. In 1866 he was a member of the Lowell council, alderman in 1877, member of school committee during the years 1870, 1874 and 1875, 1880 and 1881, city physician from 1866 to 1868. He was president of the Middlesex North Medical Society for two years, and since 1862 had been a member of the Massachusetts Medical Society. He is survived by his widow.

Miscellany.

EXPERIMENTAL INVESTIGATION OF THE CAUSE OF PELLAGRA.

THE United States Public Health Service has recently issued a bulletin describing the progress of the experimental investigation which it has been making, with a view to determining, if possible, the cause and the cure of pellagra. As a result of this research it is suggested that pellagra is, in reality, a deficiency disease, analogous to beri-beri and scorbutus, caused probably by insufficiency of proteid diet. The statement issued by the department is in part as follows:

"Pellagra has been increasing alarmingly throughout the United States during the last eight years, and it is estimated that 75,000 cases of the disease will have occurred in the United States in 1915, and of this number at least 7500 will have died before the end of the year. In many sections only tuberculosis and pneumonia exceed it as a cause of death.

The most recent experiment of the Public Health Service was carried out at the farm of the Mississippi State Penitentiary about eight miles east of Jackson, Miss., and together with the previous work of the Service, completes the chain in the prevention and cure of the disease. The work at the Mississippi Farm has been in charge of Surgeon Joseph Goldberger and Assistant Surgeon G. A. Wheeler of the United States Public Health Service. The Farm consists of 3200 acres, in the center of which is the convict camp. The final experiment was undertaken for the purpose of testing the possibility of producing pellagra in healthy human white adult males by a restricted, one-sided, mainly carbohydrate (cereal) diet. Of eleven convicts who volunteered for this experiment, six developed a typical dermatitis and mild nervous gastro-intestinal symptoms.

Experts, including Dr. E. H. Galloway, the secretary of the Mississippi State Board of Health; Dr. Nolan Stewart, formerly superintendent of the Mississippi State Hospital for the Insane at Jackson; Dr. Marcus Hause, professor of dermatology, Medical College of the University of Tennessee, Memphis, Tenn.; and Dr. Martin R. Engman, professor of dermatology in the Washington Medical School, St. Louis, Mo., declare that the disease which was produced was true pellagra.

Prior to the commencement of these experiments, no history could be found of the occurrence of pellagra on the penitentiary farm. On this farm are 75 or 80 convicts. Governor Earl Brewer offered to pardon twelve of the convicts who would volunteer for the experiment. They were assured that they would receive proper care throughout the experiment, and treatment should it be necessary. The diet given was bountiful and more than sufficient to sustain life. It differed from that given the other convicts merely in the absence of meats, milk, eggs, beans, peas, and similar proteid foods. In every other particular the convicts selected for the experiment were treated exactly as were the remaining convicts. They had the same routine work and discipline, the same periods of recreation and the same water to drink. Their quarters were better than those of the other convicts. The diet given them consisted of biscuits, fried mush, grits and brown gravy, syrup, corn bread, cabbage, sweet potatoes, rice, collards, and coffee with sugar. All components of the dietary were of the best quality and were properly cooked. As a preliminary, and to determine if the convicts were afflicted with any other disease, they were kept under observation from February 4 to April 9, two and a half months, on which date the one-sided diet was begun.

Although the occurrence of nervous symptoms and gastro-intestinal disturbances was noted early, it was not until September 12, or about five months after the beginning of the restricted diet, that the skin symptoms so characteristic of pellagra began to develop. These symptoms are

considered as typical, every precaution being taken to make sure that they were not caused by any other disease. The convicts upon whom the experiment was being made, as well as twenty other convicts who were selected as controls, were kept under continuous medical surveillance. No cases of pellagra developed in camp excepting among those men who were on the restricted diet. The experimenters have therefore drawn the conclusion that pellagra has been caused in at least six of the eleven volunteers as a result of the one-sided diet on which they subsisted."

Subsequent confirmation of these results by other experiments may lead to the complete demonstration of the suggested etiology. Such confirmation must, of course, be awaited before the unqualified acceptance of these conclusions.

STATUS OF ENGLISH MEDICAL STUDENTS.

In the issue of the *London Times* for August 25 attention was called by the medical correspondent of that periodical to the danger of the announcement that the British War Office "would be very unwilling to suggest that junior medical students should be discouraged from taking combatant commissions." In its issue of November 3 the *Times* reverts to the same topic with particular reference to the status of medical students since the publication of Lord Derby's recent appeal to the male population. Its comment on this important question is in part, as follows:

"The War Office was willing that medical students in their fourth and fifth years should continue their studies with a view to qualifying as soon as possible, and discouraged the granting of commissions to these men, but the medical profession urged that by allowing the younger students to take combatant commissions the visible supply of medical students would be used up, and the medical schools emptied, so that three or four years hence the number of doctors would be even lower than at present.

"In view of the recent issue of Lord Derby's appeal, which was received by the junior students at the medical schools, the question has again come to the front, and yesterday a deputation consisting of the President of the College of Physicians, the President of the College of Surgeons, the Deans of the medical schools, and the Vice-Chancellor of the University of London waited upon Lord Derby to discuss the matter with him. It was pointed out to him that the medical curriculum extends to five years, and in view of the fact that Lord Derby's letter was being received by students in their first, second, and third year the authorities were anxious to know whether it would not be possible to

exempt them. It was urged very strongly that the medical student would be of much more service to the nation if he continued his studies and qualified as a doctor in three, four, or five years' time than if he joined the Army as a combatant at present.

"Lord Derby, after hearing the views of the deputation, gave his decision on the point in the following words: 'It is the duty of medical students (other than those in the fourth and fifth years of study) to join His Majesty's Forces.'

"According to the statistics published at the beginning of September, the number of students in 10 leading medical schools during the first year of the war was 1891, as compared with the normal total of 2562. The effect of Lord Derby's decision will be, of course, to deplete the number of students still further.

"In his presidential address at the opening of the 102nd session of the General Medical Council recently, Sir Donald MacAlister dealt with the question of recruiting medical students.

"They had it on the highest authority, he said, that within the next few months every qualified man of suitable age who was fit for the work of an officer in the medical corps would be needed. The profession looked to the public to lighten the sacrifices and burdens which all practitioners must endure in these days both by loyalty to the absent and by consideration for those who took their place. The proportion of country practitioners who had been set free for military service was higher than that from the large centres of population. The town doctor, owing to the somewhat loose attachment of his patients to him, feared that they might be alienated if he went into the Army. The Medical War Committees were endeavouring to promote equitable agreements between practitioners who remained on civil duty and their colleagues on active service, and he thought the profession had given abundant proofs that it would not be wanting in duty or in self-denial.

"From the British Dominions and from other countries over 240 practitioners had been registered this year, and it was believed that when certain reciprocity arrangements had been completed, the number from Canada would be considerably increased. Although the War Office authorities recognized that the withdrawal from professional instruction of large numbers of medical students, of the first three years, would have a serious effect on the future, they had deemed it inadvisable to discourage junior students who offered themselves for combatant service. It was much to be desired, he thought, that the Army authorities should give clearer guidance on this perplexing question. The result of medical students accepting commissions and enlisting was that the prospective shortage of 250 qualified practitioners per annum which he had mentioned on a former occasion as probable during the coming years would almost certainly be exceeded."

MEMORIAL OF DR. AUSTIN FLINT.

At its meeting on October 15, 1915, the medical faculty of Cornell University adopted the following memorial of the late Dr. Austin Flint, whose obituary notice appeared in the issue of the JOURNAL for October 7:

"Austin Flint, M.D. LL.D., professor emeritus in the Cornell University Medical College, passed away September 22, 1915, in the eightieth year of his age. A student of Claude Bernard and of Robin, he early achieved distinction. Thus, in 1862, at the age of twenty-five, he discovered a substance in human feces which he called stercorin, recognizing it as a derivative of cholesterol. This discovery was awarded honorable mention by the Institute of France. It did not receive full recognition because of an unfavorable pronouncement by Hoppe-Seyler. However, in 1896, stercorin was again discovered, this time by Bondzynski, and given the name of koprosterin. To Flint, however, working with older, cruder methods, belongs the credit of having first isolated the substance in pure crystalline form. Austin Flint was one of the greatest teachers of the old school of American medicine. A forceful orator and skilled experimentalist, he was the first in this country to expound the doctrines of the French school of physiology which in his early life was at the height of its renown. Dr. Flint took pride in being of the fifth generation of noted physicians, his great-grandfather and his father having borne the name Austin Flint, a name which outlives him in a surviving son.

RESOLUTIONS.

ADOPTED by The American Medical Editors' Association, at its recent meeting in New York.

Whereas, The American Medical Editors' Association believe that the principle of the freedom of the press bears unusual force in relation to the medical press, discussing subjects germane to medical progress, and

Whereas, The Southern California Practitioner has been indicted by the United States Postal Department because of the publication of an article dealing with the "sex question" which appeared in the issue of March, 1914.

Be It Resolved, That the American Medical Editors' Association express to Dr. George E. Malsbary, Editor of the Southern California Practitioner, its confidence and moral support in the pending action.

Be It Resolved, That the American Medical Editors' Association assure Dr. Malsbary of its willingness and readiness to afford him any assistance and support within its power according to the Constitution and By-Laws.

IRA S. WILE,
C. W. FASSETT,
HENRY R. HARBORER,
Committee.

October 19, 1915.

Correspondence.

AN AUTHOR'S CORRECTION.

BOSTON, MASS., Nov. 22, 1915.

Mr. Editor: An editorial comment in the JOURNAL for Nov. 13, regarding an article of mine on the "Midwife Problem" appearing in the same number, states that the article in question "reaches the conclusion that in view of the obvious deficiencies of training in obstetrics in this country, the best method of meeting the needs of the situation is to adopt the midwife system of Europe, placing it, however, under suitable regulation and providing adequate training for those who undertake this work." I would take exception to this as not being a correct statement of the conclusions reached. I recognize the right of the editor to differ with or to criticize opinions expressed in the article, but not to base those differences or criticisms on a misinterpretation.

The article, attempting to deal with the subject broadly, describes the opinions of many workers in this field, and while those opinions may not always be our own, at least, they merit our respectful consideration. In conclusion, it states: "there is a distinct tendency in many quarters to adopt the midwife as an institution after the manner of its conduct in the countries of Europe," a statement of fact, not an opinion that it is the best solution of the problem. Further, the article even questions if it is the most practical solution, as is shown by the conclusion that "our method of government is not adapted to the rigid requirements which the properly regulated midwife demands."

My suggestion for securing for "every parturient the attention commensurate with present-day standards" is not by the establishment of a midwife organization, but rather that the community, coming to realize its vital interest in this problem, adopts the care of its maternity cases in the same manner that it adopts the care of those of its sick who are unable to secure proper care for themselves, not leaving that care entirely to the commendable but often inadequate efforts of private charities.

I would yield to no one in my appreciation of obstetric ideals and I trust you will see the desirability of correcting the erroneous imputation in your editorial comment.

Very truly yours,

A. K. PAINE, M.D.

A READER'S CORRECTION.

BOSTON, NOV. 24, 1915.

Mr. Editor: The BOSTON MEDICAL AND SURGICAL JOURNAL in its last issue published two articles discussing the problem of the midwife and the obstetrical situation in Boston. The paper by Dr. Paine was read before the Chirurgical Society of Boston when I was its president. I, therefore, feel at liberty and that it is only just to him to say that the conclusion which the editorial comment in the same number of the JOURNAL states as Dr. Paine's views is at a variance with the impression his paper made on the Society when he presented it and on me when I read it.

Dr. Paine begins his article by stating that his title is a misnomer and that the midwife represents but a part of the general situation. In his conclusions he definitely states that "our method of government is not adapted to the rigid requirements which the properly regulated midwife demands." His chief conclusion is that "the state should assume the management and control" of poor pregnant women through their pregnancies and confinements, not only because of humanitarian reasons but also because of the civic importance of the subject.

Before sending you this letter I called up Dr. Paine to be sure that I understood him aright and he said that he did not feel that the "midwife system of Europe" was one for us to adopt, but that it could not be lightly dismissed as all evil without careful consideration.

My purpose in writing you is to call your attention to the fact that the convictions of the authors towards the midwife problem do not differ so materially as the editorial comment would lead the casual reader to believe.

Cordially yours,

HILBERT F. DAY, M.D.

A QUESTION OF PRIORITY.

MOUNT SINAI HOSPITAL

BOSTON, MASS., Nov. 19, 1915.

Mr. Editor: In reading the interesting article by Dr. J. L. Huntington on "Pregnancy Clinics" in the last number of the BOSTON MED. AND SURG. JOURN., I noticed an inaccuracy which I desire to call to your attention. Dr. Huntington states that "the Boston Lying-In Hospital was the first to establish a real Pregnancy Clinic in Boston in connection with its other work . . . It was started in 1911 and now there are at least three other similar clinics in Boston."

By reference to the published Annual Reports of the Mt. Sinai Hospital of Boston, you will find that the Pregnancy Clinic at this institution was started in 1908, under the name of Antepartum Clinic. The idea was suggested to the staff by Dr. A. K. Paine, and so far as we know it was given practical application for the first time at this hospital. In its early days only a small proportion of the applicants for treatment could be induced to submit to pre-natal examination and treatment, but now the majority are glad to avail themselves of the opportunity. Again reference to the Annual Reports will show that the treatments at this clinic were in 1908, 41; 1909, 44; 1910, 99; 1911, 156; 1912, 264; 1913, 346, and in 1914, 432. The deliveries in the past three years have averaged 350 per year.

From the start the clinic has been run along the lines which Dr. Huntington has developed in his article. In addition to a member of the obstetrical staff, who plans to see each patient at least once during pregnancy, we have a trained social worker who gives a good part of her time to investigating home conditions previous to delivery. Recently we have also inaugurated a system of "follow-up work" which covers special cases demanding particular attention after delivery.

Thanking you for the opportunity for making this correction, I am,

Yours sincerely,

S. A. MOULTON, M.D.,

Superintendent.

SOCIETY NOTICES.

NEW ENGLAND PEDIATRIC SOCIETY.—The thirtieth meeting of the New England Pediatric Society will be held in the Boston Medical Library, Friday, Dec. 10, 1915, at 8.15 P.M.

I. Report of Council and nomination of officers.

II. Report of Treasurer.

III. The following papers will be read:

1. Simple Incision in the Treatment of Pyloric Stenosis, by James S. Stone, M.D., Boston.

2. Spasmodic: Report of Ten Cases.—Etymology and Treatment, by Fred P. Webster, M.D., Portland, Me.

3. Fermentative Diarrhea in Infants, by Lewis W. Hill, M.D., Boston.

IV. Election of officers.
Light refreshments will be served after the meeting.

F. M. BUCKINGHAM, M.D., *President*.
RICHARD M. SMITH, M.D., *Secretary*.

HARVARD MEDICAL SOCIETY.—Historical club meeting in the Peter Bent Brigham Hospital Amphitheatre, Tuesday evening, December 7, 1913, at 8.15 o'clock.

PROGRAM.

1. "Surgery in London One Hundred Years Ago as Observed by an American Surgeon of the Old School." Dr. J. Collins Warren, Boston.
 2. "Florence Nightingale and Modern Red Cross Organization." Dr. Maudie E. Abbott, Montreal.
- Medical students and physicians are cordially invited to attend.

ERNEST G. GREY, M.D., *Secretary*.

NORFOLK SOUTH DISTRICT MEDICAL SOCIETY.—Meeting for Medical Improvement, at United States Hotel, Boston, Thursday, December 2, 1913, at 11.30 A.M.

Reader, A. L. MacAusland, M.D., Boston, Mass., for Hjalmar Ahlstrom, M.D., Quincy, Mass. Subject: "Hip Joint Diseases and Injuries."

F. H. MERRIAM, M.D., *Secretary*,
South Braintree, Mass.

SUFFOLK DISTRICT MEDICAL SOCIETY—SURGICAL SECTION.—Meeting Wednesday, December 13, at 8 P.M., at the Boston Medical Library.

Address by Dr. William Rodman of Philadelphia, on "Surgery of Gastric Ulcer."

CHARLES L. SCUDDER, M.D., *President*,
W. J. MIXTER, M.D., *Secretary*.

NOTICES.

WAR LECTURES FOR THE BENEFIT OF THE SOCIAL SERVICE DEPARTMENT OF MASSACHUSETTS GENERAL HOSPITAL.

On Monday of next week, December 6, Dr. C. A. Porter and Dr. Robert B. Osgood will give at Sleeper Hall, Boston, at 4 P.M., the second of a series of war lectures for the benefit of the social service department of the Massachusetts General Hospital. This lecture will be on the work of the Harvard Unit in the hospitals of France. Tickets, at a cost of \$1.50 each are on sale at Herrick's at 1 Marlborough St., and at the Social Service Department of the Massachusetts General Hospital. Mail orders will be filled by this department. Checks should be made payable to Francis P. Sears, Treasurer, and sent to the hospital. These lectures are in charge of a committee of which Dr. Richard C. Cabot is chairman and among whose members are Dr. Daniel F. Jones, Dr. Roger I. Lee, Dr. Robert B. Osgood, Dr. James J. Putnam, Dr. Richard M. Smith and Dr. Frederick A. Washburn.

MASSACHUSETTS HOMEOPATHIC HOSPITAL.—Department of Clinical Research and Preventive Medicine, Evans' Memorial.—The Evans' Memorial for Clinical Research is desirous of coming into communication with as many physicians as possible who have used bacterial vaccines in the treatment of typhoid fever for the purpose of collecting statistics concerning the efficiency or non-efficiency of the method as a therapeutic measure. If any who have done this even with only one or a few cases will send their names and addresses, blank forms will be sent to them upon which uniform reports may be made. Due credit will be given to each in any reports that may be published. Kindly address all communications to Dr. W. H. Watters, 80 East Concord Street, Boston.

APPOINTMENTS.

Dr. George Adams Leland, Jr., of Boston, has been appointed associate in surgery at the Massachusetts General Hospital.

Dr. L. G. Rowntree of the medical department of Johns Hopkins University, has been appointed professor of medicine and chief of the department of medicine in the medical school of the University of Minnesota.

At the recent meeting of the Board of Overseers of Harvard College, Dr. Robert Williamson Lovett was elected to the John B. and Buckminster Brown Professorship of Orthopedic Surgery in the Harvard Medical School. The following administrative boards in graduate departments were also appointed:

Harvard Dental School, Dean Eugene Hanes Smith, Charles Albert Brackett, George Howard Monk, William Parker Cooke, William Henry Potter, Amos Irving Hadley, Samuel Tuttle Elliott, George Henry Wright, Leroy Matthee Simpson Miner; Harvard Medical School, Dean Edward Hickling Bradford, Harold Clarence Ernst, George Gray Sears, David Linn Edsall, Reid Hunt, Robert Bailey Greenough, John Lewis Bremer, Francis Winslow Palfrey, *ex-officio*; graduate school of medicine, Dean Horace David Arnold, Edward Hickling Bradford, Algernon Coolidge, Robert Williamson Lovett, Charles Locke Scudder, Frederick Taylor Lord, Walter Clarke Howe, *secretary*.

RECENT DEATHS.

DR. HENRY CHARLETON BASTIAN, who died recently at Chesham Bois, Buckinghamshire, England, was born at Truro, Cornwall, on April 26, 1827. He obtained his education at University College, London. Later he became instructor and professor of pathological anatomy at that institution until 1887. He then became professor of the principles and practice of medicine until 1895 after which he remained as professor emeritus. He was for many years consulting physician to the National Hospital for the Paralyzed and Epileptic in London and was a prolific writer on neurologic and psychiatric subjects.

DR. THOMAS C. TREADWELL, who died of nephritis on Nov. 18 at Stoneham, Mass., was born in New York City in 1863. He had practised in that city as a dentist for many years. He is survived by his widow.

DR. GEORGE HENRY WILKINS, who died recently at Framingham, Mass., was born at Amherst, N. H., on Dec. 28, 1835. After obtaining his preparatory education at the New Hampshire State College, he received the degree of M.D. from the New York Homeopathic Medical College. From 1883 to 1902 he practised his profession in Palmer, Mass., removing later to Newtonville, Mass., where he has served for the past ten years, as a member of the staff of the Newton Hospital. He was a member of the Massachusetts Homeopathic Medical Society, the Worcester Medical Society and the Springfield Medical Society and was a lecturer at the Boston University School of Medicine. He is survived by his widow.

DR. FREDERICK WILLIAM RUSSELL, a retired Fellow of The Massachusetts Medical Society, died at the home of his daughter in Dallas, Texas, Nov. 20, aged 70 years. He was a graduate of the New York University Medical College in 1870 and had maintained a private hospital, of fifteen beds, for mental cases in Winchendon, Mass., since 1875.

DR. BENJAMIN JOY JEFFRIES died at his home in Boston, Nov. 21, aged 82 years. He had been a noted ophthalmologist and had practised in Boston from 1859 up to the time of his retirement a few years ago. He was a councillor of The Massachusetts Medical Society from 1875 to 1908, and was the orator in 1888. For many years he had been librarian of the Suffolk District Medical Society, holding the office at his death.